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ORIGINAL ARTICLES.

THE TREATMENT OF DIPHTHERIA WITH DIPHTHERIA ANTITOXIN.*

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[CONCLUDED.]

The following was the list of questions sent by me to different physicians who had used the antitoxin:

1. Number of cases?
2. Age?
3. Sex?
4. Result?
5. Was a bacteriologic examination made?
6. The day of disease when injection was made? And quantity?
7. If the case had a fatal termination? How long after injection?
8. Cause of death?
9. Variety of diphtheria:

Laryngeal	{	Intubate?	} Before or after injection?
		Tracheotomized?	
10. If death intubate? Tracheotomized?
11. Fauces and larynx?
12. Fauces, nasal, and laryngeal?
13. Nasal?
14. Palatal and faucial?
15. Buccal and faucial?
16. How long after injection did membrane disappear?
17. How long after injection was throat free of membrane?
18. How long after injection was throat free of bacteria?
19. When did you notice a decline in pulse, respiration, and temperature?
20. Did you notice any skin eruption?
21. Did you notice any joint pains?
22. Did you notice any adenitis?
23. Did you notice any otorrhoea?
24. Did you notice any renal complications?

Albuminuria?	} Before or after injection?
Anuria?	
Nephritis?	
25. Did you notice any pneumonia?
26. Did you notice any sequelæ? Paralysis, etc?
27. Did the diphtheria come after scarlatina or measles?
28. Did you practice immunization?

Adults?
Children?
29. How much serum at an injection?

Adults?
Children?
30. Was bacteriologic examination made of those immunized?
31. Was any one attacked with diphtheria after immunization? How long after injection?

The questions I most desired answered were those upon which the antagonists of the serum-therapy laid most stress. They were: skin eruption, joint pains and swelling, renal complications, sequelæ, and whether immunization protects. The question of

diphtheria coming as a complication or an addition, or following scarlatina or measles was particularly interesting to me, as in my opinion these cases are the most serious, if not the most fatal. As for myself, diphtheria of the larynx (membranous croup) following measles was always in my experience fatal, whether intubated or not, under other methods of treatment. These cases, like the statistics, speak for themselves. I simply copied the reports made to me, curtailing them as much as possible so as to prevent this paper reaching too great a length.

Report of Dr. W. E. Johnson, Waverly, N. Y. Number of cases, 4; 3 females, 1 male. Ages were six, eight, ten, fifty-six years. Result, recovery. No bacteriologic examinations were made; 1 case fauces and larynx; 1 case fauces, nasal and larynx; 2 cases palatal and faucial.

Intubation or tracheotomy unnecessary. The quantity of antitoxin used was 60 c.cm. (6000 immunity units) to case fifty-six years old, with disappearance of membrane on fifth day; 20 c.cm. (2000 immunity units) in each of the other cases, with disappearance of membranes on third day. One case (fifty-six years) showed joint pains, and was followed by paralysis; one case showed albumin after injection. McFarland's (H. K. Mulford Co.) antitoxin used.

Report of Dr. C. P. Adams, Trenton, N. J. Number of cases, 2; females. Ages five, thirty years. Result, recovery. No bacteriologic examination. One death in the family (female, aged three years) one day previous to the doctor's care of these cases; 1 case fauces and larynx, aged five years; 1 case palatal and faucial, aged thirty years.

The quantity of antitoxin used was 20 c.cm. (2000 immunity units) in each case. Membranes disappeared on third day. Pulse and fever declined in twenty-four to thirty-six hours. Adenitis in both cases. Antitoxin used, Behring's and Gibier's. Injections made on the second day.

Report of Dr. I. R. Schoonmaker, Sayre, Pa. Number of cases, 2; 1 male, 1 female. Ages ten, fifty years. Result, recovery; 1 case faucial, buccal, and palatal, ten years; 1 case faucial and laryngeal, fifty years.

No bacteriologic examination. Injection, in adult, on second day, 20 c.cm. (2000) twice injected (4000 immunity units); two injections 10 c.cm. each (2000 immunity units), in child. A death previously (aged thirty-one years), two days before doctor treated the above cases. The membranes disappeared in child on third day; in adult on the fifth day. Pulse and temperature declined in twenty-four hours. Eruption in child erythematous in character. No sequelæ or complications in either case. McFarland's antitoxin used.

Report of Dr. J. N. Richards, Fallsington, Pa. Number of cases 1; female, aged three years. Result, recovery.

No bacteriologic examination. Injections were made on the third and fifth days, 10 c.cm. each (2000 immunity units). The membranes began to disappear in from twenty-four to forty-eight hours, and were gone on the third day. The pulse, respiration, and temperature declined in six hours after the second injection. No complications or sequelæ. McFarland's (Mulford's) antitoxin used. The case was one of palatal and faucial variety.

Report of Dr. W. S. Long, Haddonfield, N. J. Number of cases, 3; females. Ages, six weeks three days, three and a half years, thirty years. Result, recovery. No bacteriologic examination; 1 case fauces and larynx; 1 case faucial, nasal, and laryngeal; 1 case palatal and faucial.

Injections were made in one case on the third day, another on the fourth day, and another on the second day of the disease. The membranes disappeared on fourteenth day in first, seventh day in second, and in two days in third. Urticaria was noticed in first case. Some paralysis was noted in first two cases. Immunization was practised on third case; 5 c.cm. (500 immunity units) injected; third week after, visual traces of the disease were manifested; 15 c.cm. (1500 immunity units) was then administered. The other received first 10 c.cm. (1000 immunity units), then 15 c.cm. (1500 immunity units).

Report of Dr. A. F. Hyde, Shelby, O. Number of cases, 7; 5 males, 2 females. Result, recovery in 6; 1 death. Bacteriologic examination made in one case.

No.	Age.	Variety.	Quantity and day of injection.
1	4½ years.....	larynx and faucial.....	5 c.cm. (750 units) 3d day Behring's No. 3.
2	33 years.....	larynx, palatal, and faucial.....	5 c.cm. " 5th " " "
3	14 years.....	larynx and faucial.....	8 c.cm. (1200 units) 8th " " " "
4	13 years.....	larynx and faucial.....	5 c.cm. (500 units) 5th " McFarland's.
5	5 years.....	faucial.....	5 c.cm. (500 units) 6th " " " "
6	1 year.....	faucial.....	2 c.cm. (300 units) 1st " " " "
7	3 years.....	faucial and laryngeal.....	3 c.cm. (450 units) 2d " Behring's No. 3.

The membranes three days after injection were entirely gone, and began to disappear in twenty-four to forty-eight hours. All these cases suffered from adenitis. In one case (No. 2) pneumonia was a complication. As a sequelæ, 3 cases suffered from paralysis (2 aphonia). Immunization was practised once, 2 c.cm. (300 units), Behring's No. 3 being used, and was successful. The fatal case (No. 5) was septic and moribund, dying seven hours after injection.*

Report of Dr. S. I. Bassford, Biddeford, Me. Number of cases, 3; 1 male, 2 females. Result, 1 recovery, 2 deaths. No bacteriologic examination made; 1, aged fourteen months, fauces, nasal and larynx; Gibier's; second day, death; 2, aged eight years, fauces and larynx; Behring's; second day, death; 3, aged five years, fauces, nasal and larynx; Behring's; sixth day, death. Case No. 1 died of pneumonia (catarrhal) twenty-seven days after injection. Case No. 3 died in twenty-four hours, of sepsis. Case No. 1 came as a sequel to scarlet fever. Membranes disappeared in successful case in forty-eight hours.

Report of Dr. Wm. McD. Struble, Trenton, N. J. Number of cases, 11; 8 males, 3 females. One death.

No.	Age.	Variety.	Quantity and day of injection.
1	15 months.....	faucial.....	5 c.cm. 1st, 5 c.cm. 2d (1000 units) Behring's No. 2.
2	11 months.....	faucial.....	10 c.cm. (1000 units) 1st day " " "
3	11 years.....	faucial and nasal.....	10 c.cm. " 1st " " "
4	4 years.....	faucial.....	10 c.cm. " 1st " " "
5	23 months.....	faucial and larynx.....	10 c.cm. " 5th " " "
6	4½ years.....	faucial.....	10 c.cm. " 1st " " "
7	5 years.....	faucial and nasal.....	10 c.cm. " 1st " " "
8	3 years.....	faucial and nasal.....	10 c.cm. " 2d " " "
9	2 years.....	faucial.....	10 c.cm. " 1st " " "
10	12 years.....	faucial.....	10 c.cm. " 1st " " "
11	2 years.....	faucial.....	10 c.cm. " 2d " " "

Case No. 5 died from asphyxia. No bacteriologic examination was made. The membranes disappeared in 6 on third day, in 2 on fourth day, in 2 on fifth day, in 1 on sixth day after injection. Decline in pulse and temperature was noticed in six hours in 2 cases, eight hours in 3 cases, twelve hours in 2 cases, twenty-four hours in 2 cases, and forty-eight hours in 1 case. A slight

erythema was noticed in half the cases. All had enlarged glands, but no suppuration. In 2 cases albumin was found. In case No. 1 (first case treated) temperature fell in six hours, but again rose and continued until throat was free of membrane. As an addition, Dr. Struble sent me an explanation of the method used by him to clinically establish the value of antitoxin. He first used antitoxin on 5 cases with one death (Case No. 5), which could not have recovered under any method of treatment. He then treated a second series of 5 cases (these cases coming to him in regular order); of these, 2 died. They were treated without antitoxin, and were of the same character as the first series. He then treated a third series of 5 cases with antitoxin, and all recovered. Two cases of a fourth series, starting the same plan of experimentation, were so serious and so prolonged that he rejected the old plan of treatment and used the antitoxin treatment, although these two recovered.

Report of Dr. G. Metzler, Philadelphia, Pa. Number of cases, 1. Other cases seen and treated by Dr. Metzler appear in report of my cases. Female, aged six years. Recovery. No bacteriologic examination made. Case was one of

faucial diphtheria. Injected, on the third day, with 5 c.cm. (500 immunity units) McFarland's antitoxin. The temperature and pulse began to decline within twenty-four hours. The membranes softened within twenty-four hours, and disappeared in three days. Dr. Metzler practised immunization in 11 cases, using 1.5 c.cm. (150 immunity units) in each case. No diphtheria appeared in any.

Report of Drs. Eugene F. and Louis

* Three of these cases were reported in the Columbus Medical Journal, April 30, 1895, No. 9, vol. xiv.

Hauck, St. Louis, Mo. Number of cases, 18; 9 males, 9 females; 2 deaths. Bacteriologic examinations made in each case. Ages were from sixteen months to forty-four years. Injections were made, 6 on second, 6 on third, 4 on fourth, and 2 on sixth day of disease; 5 cases fauces and larynx, 1 death; 1 case fauces, nasal, and larynx, 1 death; 12 cases palatal and faucial. Of the 6 laryngeal cases 5 were intubated, with 2 deaths after intubation. The membranes disappeared, 6 in two days, 6 in four days, and 4 in five days. The throat was free from bacteria only after three weeks. Temperature and pulse declined after twelve hours in the majority of cases, some as early as three hours. Joint pains were noticed once. Paralysis came as a sequel three times. Diphtheria came as a sequel to scarlatina once, with recovery. Immunization was practised on two adults and two children. No diphtheria followed in those immunized. Bacteriologic examination was not made on those immunized. Behring's, Gibier's, and McFarland's antitoxin was used.

Report of Dr. S. J. Ottinger, Philadelphia, Pa. Number of cases, 1; male, aged four years and ten months. Result, death. Bacteriologic examination was made. The case was one of laryngeal, faucial, and nasal variety, and was septic. Injected, on seventh day, with 10 c.cm. (1000 immunity units) Mulford's antitoxin. Repeated in six hours with 10 c.cm. (1000 units) more. The child died fifteen hours after first injection. There was a decline in pulse, respiration and temperature four hours after second injection. The cause of death, paralysis of the heart.

Report of Dr. G. E. Roos, Scranton, Pa. Number of cases, 25; both male and female. One death. Ages were between six months and ten years. No bacteriologic examination was made. The injections were all made between the first and fourth days, and from 1000 to 2000 units used. In the case that died, death came two days after injection from suffocation from membrane below the tube, a case which the doctor writes should have been tracheotomized; 14 cases palatal and faucial; 9 cases faucial and larynx; 2 cases nasal and faucial.

Of the laryngeal cases 5 were intubat-

ed, with one death. The membranes began to disappear in twenty-four to forty-eight hours, and the throat was free in two to eight days. Pulse, temperature, and respiration declined twenty-four hours after injection. One case had pneumonia before injection.

Report of Dr. Alexander Klein, Philadelphia, Pa. Number of cases, 2; females. Ages two and seven years. Result, recovery. Both were palatal and faucial, and were injected, on the second day for the seven-year child and on the fourth day for the two-year child, with 10 c.cm. (1000 units) Behring's No. 2. The seven-year child's throat cleared on fourth day; the two-year child's on the third day. Bacteriologic examination was made of both cases, and the throat was pronounced clear of bacteria (KL) in one month for the seven-year and five weeks for the two-year child. Temperature and pulse declined in twenty-four hours; 1 case showed an eruption, and 1 case showed joint pains. Immunization was practised in 11 cases; 4 adults, 7 children. The adults received 300 units, the children received 200 units, and remained well.

Report of Dr. Samuel P. Gerhard, Philadelphia, Pa. Number of cases, 5; 4 females, 1 male. Ages three, four, four, five and six years. Result, recovery.

Bacteriological examinations were made at the laboratory of the Philadelphia Board of Health, and were pronounced true diphtheria. Injections, 7 c.cm. (1400 units), were made twice on third day; once, 10 c.cm. (1000 units), on first day; once, 10 c.cm. (1000 units), on second day; once, 10 c.cm. (1000 units), on fifth day of the disease; 2 cases were fauces and larynx; 1 case was faucial, nasal, and laryngeal; 2 cases were palatal and faucial. The membranes began to disappear in 1 case in forty-eight hours, in 3 cases in three days, and in 1 case in four days. The throat was free from membranes on the fifth day in all cases, and was free of (KL) bacilli in eight days in 3, and in ten days in 2 cases. The temperature and pulse began to decline in six hours after injection. Skin eruption was noted in 1 case after injection; in a second case before the injection. Adenitis was noted in 3 cases before the injection; in 1 case anuria with cedema after injection.

tion. Doctor, however, thinks that the cause of this was exposure to cold and damp; the child was permitted to play in water on a cold day. Two cases had paralysis as a sequel. Immunization was practised in one case, on which a bacteriologic examination was made, no bacilli being found. McFarland's (Mulford's) antitoxin was used.

Report of Dr. H. H. Freund, Philadelphia, Pa. Number of cases, 4; 3 males, 1 female. 1 death.

No.	Age.	Variety.	Quantity and day of injection.
1.	18 months.....	faucial, nasal and laryngeal.....	10 c.cm. Behring's No. 2 (1000) 3d day.
2.	1 year	laryngeal.....	10 c.cm. Behring's No. 1 (600) 1st "
3.	2 years	faucial and larynx.....	10 c.cm. Behring's No. 2 (1000) 3d "
4.	4 years	faucial and laryngeal.....	10 c.cm. Behring's No. 2 (1000) 4th "

Of these cases 2 were intubated, with 1 death, forty-eight hours after injection. The cause of death being given as œdema of the lungs. In the favorable cases the membranes began disappearing on the third day, and were gone on the fifth day. A decline in pulse, temperature, and respiration was noted in forty-eight hours. One case, which ended favorably, had pneumonia. (Cases reported in *The Medical News*.)

Report of Dr. Chas. D. Spivak, Philadelphia, Pa. Number of cases, 4; 2 females, 2 males. Result, recovery.

No.	Age.	Variety.	Quantity and day of injection.
1	1 year 4 months.....	palatal and faucial.....	3d day of disease 1000 units.
2	2 years	fauces nasal and laryngeal.....	2d " " " "
3	8 years	faucial and palatal.....	4th " " " "
4	30 years	faucial and palatal.....	1st " " " "

No bacteriologic examination made. Laryngeal case intubated several hours before injection. The membrane began to disappear on the second day in cases 1, 3 and 4. In case No. 2 five days elapsed before membrane disappeared from the fauces, and sixteen days before the tube could be withdrawn and left out. The temperature, pulse, and respiration declined in six to eight hours. Case No. 1 had adenitis. This case came as a sequel to measles.

Report of Dr. J. J. Owen, Philadelphia, Pa. Number of cases, 2; 1 male, 1 female; ages two years. 1 death. Case No. 1, laryngeal, 10 c.cm. Behring's No. 2. Intubated. Death in forty-eight hours. Case No. 2 palatal and faucial, 17 c.cm. (1700 units) Behring's No. 2. Injected on fourth day.

The case that recovered required two injections. Temperature and pulse declined four hours after each injection

from 103° to 99°. The laryngeal case was injected on the first day.

Report of Dr. George A. Muehleck, Philadelphia, Pa. Number of cases, 26. 3 deaths.

I am somewhat familiar with Dr. Muehleck's work, he being the first to have used antitoxin in Philadelphia, Pa. Dr. Muehleck makes his own bacteriologic examinations in most all the cases treated by the antitoxin, and also in those immunized. He has immunized

40 cases, all children, in half of which the Loeffler bacillus was found, and not a single case showed any visual signs of the disease. In his practice he used Gibier's antitoxin in 5 cases, Behring's antitoxin in 4 cases, and Aronson's in 17 cases. The erythematous rash followed in all cases upon which Gibier's antitoxin was used. Of Behring's he used 5 c.cm. of No. 3, equivalent to 750 units. The same quantity of Aronson's was used. (See table next page.)

In the cases that died the injections were all made a few hours before death.

The membranes began to disappear in the faucial and palatal cases in twenty-four to thirty-six hours; in the laryngeal forty-eight to seventy-two hours. The throat cleared from five to six days in the faucial, and from seven to ten days in the laryngeal. The throat cleared of bacteria in four to five weeks.

The temperature, pulse, and respiration declined within four to six hours. Albumin was found in 12 cases, the most severe ones, before injection, which did not appear to have any influence on the symptom. Paralytic (faucial) symptoms came as a sequel in about twelve cases, but disappeared very soon. Three cases were a sequel to measles, 1 of these died. In the cases immunized Dr. Muehleck used Aronson's, McFarland's, and Solis-Cohen's. He gave from 100 to 300 immunity units. In no single case was there any outbreak. (4 cases reported in *The Medical News*. Dr.

No.	Age	Sex.	Variety.	Injection.	When Injected.
1	4 years	Male	laryngeal.....	Aronson's.....	2d day.
2	3 years	Male	palatal and faucial.....	Gibier's.....	2d "
3	6 months	Male	palatal and faucial.....	Gibier's.....	2d "
4	2 years	Female	palatal and faucial.....	Gibier's.....	2d "
5	5 years	Female	palatal and faucial, nasal and laryngeal.....	Aronson's.....	6th "
6	7 years	Male	palatal and faucial.....	Gibier's.....	1st "
7	4 years	Male	buccal and faucial.....	Gibier's.....	1st "
8	9 years	Male	palatal and faucial.....	Aronson's.....	2d "
9	9 months	Male	nasal and faucial.....	Aronson's.....	2d "
10	6 years	Male	faucial and palatal.....	Aronson's.....	2d "
11	1 year 9 months	Female	fauces and larynx.....	Behring's.....	3d "
12	3 years	Male	faucial and palatal.....	Behring's.....	1st "
13	9 months	Male	faucial and palatal.....	Aronson's.....	2d "
14	5 months	Female	laryngeal.....	Aronson's.....	2d "
15	6 months	Female	faucial and palatal.....	Aronson's.....	2d "
16	12 years	Male	fauces and larynx.....	Aronson's.....	2d "
17	4 years	Female	laryngeal, nasal, and faucial.....	Behring's.....	3d "
18	3 years	Male	laryngeal.....	Behring's.....	3d "
19	7 years	Female	laryngeal.....	Aronson's.....	3d "
20	5 years	Male	palatal and faucial.....	Aronson's.....	4th "
21	3 years	Female	palatal and faucial.....	Aronson's.....	3d "
22	1 year 2 months	Male	palatal and faucial.....	Aronson's.....	2d "
23	4 years	Male	palatal and faucial.....	Aronson's.....	2d "
24	2 years	Female	laryngeal.....	Aronson's.....	6th "
25	2 years	Female	laryngeal.....	Aronson's.....	2d "
26	2 years	Female	laryngeal.....	Aronson's.....	2d "

Muehleck presenting a paper before the College of Physicians.)

Report of Dr. Edwin Rosenthal's Cases.
Number of cases, 78; 2 deaths.

The 2 deaths are reported with Drs. Owen's and Freund's cases; and were entered by me in my list because they were intubated by me. Most of my cases had a bacteriologic examination made by Dr. A. Klein, Drs. B. Meade Bolton, Gillespie or Pease, in the Bacteriological Laboratory of the Bureau of Health, and by Dr. George A. Muehleck, in his private laboratory. I also had the case immunized examined with the result that over 50 per cent. showed the Klebs-Loeffler bacilli. In several cases, where I had given curative doses of the serum, no specific bacilli were found on bacteriologic examination; the patient showed no bad symptoms on receiving this dose. I have used Aronson's, Roux's, Gibier's, Behring's, McFarland's, and Solis-Cohen's antitoxin. In those immunized not one showed visual traces of the disease, even when constantly brought in contact with those affected. McFarland's antitoxin showed equal value with Behring's No. 2, of which I was not familiar, and in administration I used the same quantity, c.cm. for c.cm.

The cases treated were 31 males, 47 females, all white. Their ages were: 8 between one and two years old, of which 5 were intubated, with 1 death; 10 between two and three years old, of which 5 were intubated, with 1 death; 5 between three and four years old, of which 1 was intubated; 15 were between four and five years old, of which 2 were

intubated; 3 were between five and six years old, of which 1 was intubated; 4 were between six and seven years old, of which one was intubated; 2 were between seven and eight; 3 between eight and nine; 2 between nine and ten; 2 between ten and eleven; 1 between eleven and twelve; 2 between twelve and thirteen; 1 between thirteen and fourteen; 1 between fourteen and fifteen; 2 between fifteen and sixteen; 1 between seventeen and eighteen; 1 each for twenty-two, twenty-three, twenty-four, twenty-six and twenty-eight years; 5 between thirty and thirty-one; 4 between thirty-two and thirty-three years; and one each between thirty-six and thirty-seven, and forty and forty-one years of age.

There were 11 laryngeal, 4 intubated, 1 death; 12 faucial and laryngeal, 8 intubated, 1 death; 3 faucial, nasal, and laryngeal, 3 intubated; 1 faucial and nasal; 3 faucial and palatal; 48 faucial. Of these cases the most received 10 c.cm. (1000 immunity units) when Behring's or McFarland's antitoxin was used—at a dose; repeated in twelve to twenty-four hours, if necessary; if other antitoxin was used, an equivalent was administered, though some received as low as 600 units as a curative dose. In some cases Aronson's, McFarland's or Solis-Cohen's antitoxin was used as the first dose and Behring's antitoxin as the second dose. I noticed no joint pains, and a skin rash was noted in 10 cases only. Albumin was detected in only 8 cases and had nothing to do with the serum. I invariably examine the urine, as I had been taught since 1885 that al-

bumin was a complication of diphtheria and those cases so affected were serious, if not fatal. I practiced immunization on everyone willing to receive it. Dr. J. Solis-Cohen, as well as Mr. Campbell, of the H. K. Mulford Company, kindly furnished the antitoxin for my poor cases. Over 200, probably one-third adults, received an immunizing dose, about 100 to 200 (if the Loeffler bacillus was found) at a dose. In extraordinary cases, like a pregnant woman in the last days of pregnancy, they received 400 to 600 units; of this description, a case was immunized by Dr. A. Klein with success.* I also immunized phthisical as well as otherwise affected individuals, and have yet to see one case show visual signs, although one-half the cases showed by bacteriological tests the bacilli; 1 case had ozæna as a sequel. Aphonia in several cases of laryngeal was a sequel.

Injections were made on the first day of the disease in 18 cases, on the second day in 30 cases, on the third day in 22 cases, on the fourth day in 4 cases, on the fifth day in 1 case, on the sixth day in 2 cases, and on the seventh day in 1 case. In the faucial cases the membranes began to disappear on the second day, and were entirely gone by the fifth day. In the laryngeal cases stenosis was relieved on the third day; in those cases intubated the tube was allowed to remain until the fourth day; 1 case necessitated its use for sixteen days. Bacteriologic examinations showed the bacilli one month after injection. Anæmia or other sequelæ were never noticed; in the laryngeal cases the same pallor and emaciation were seen, but in two or three days were entirely gone.

Report of Dr. L. Wolff, of Philadelphia, Pa. Number of cases, 5; 3 females, 2 males. Ages, two to six years. Result, recovery.

Bacteriologic examinations were made in every case in the Laboratory of the German Hospital. Injections were made on the second day in 4 cases, and on third day in 1 case. The quantity used was 10 c.cm. (1000 units) Behring's No. 2. Immunization was practiced once on a child, and 2 c.cm. (200 units) were injected, with success; 2 cases were laryngeal and fauces, both intubated,

one before and one after injection; 3 cases were palatal and faucial.

The membranes began to disappear in from twenty-four to seventy-two hours, and the throat was clear in three to four days. It was not ascertained how long after the throat was clear of bacilli. No skin eruptions or joint pains were noted, but adenitis was a symptom. Albuminuria was noted twice, before and after injection; 1 case was followed by paralysis (1 case published in *Med. News*).

Report of Dr. John Sebastian Miller, Philadelphia, Pa. Number of cases, 18; males and females equal. Ages, one to ten years. Result, recovery. Used Gibier's, Behring's, and McFarland's.

Immunized 8 cases; no infection, all cases being successful; 7 cases were laryngeal and faucial; 2 were nasal and faucial; 8 were faucial, buccal, and palatal; 6 were faucial.

The membranes began to disappear thirty-six hours after injection, and were entirely gone in three to four days. Bacteriologic examinations were made in 12 cases. The injections were made equally on the first, second, and third days. Stenosis was relieved in the laryngeal cases on the third day; 4 cases had adenitis; albumin was found in but 1 case, and had no significance; as a sequel in 5 laryngeal cases aphonia lasting one week occurred. As an addition to his report, Dr. Miller observes: "I have not lost a single case since the antitoxin period, and most of my cases were very seriously ill; a death now to me would be an exception. Previous to the antitoxin period I looked upon diphtheria with a great deal of fear, and deaths were a common occurrence." Despite intubation, tracheotomy, etc., his percentage of deaths was always large. Whilst his cases were always serious, he can find no difference in the gravity of his present cases, except that they recover.

A summary of these reports shows the following: Cases reported, 222, almost equally divided as regards sex; adults, 44; children, 178. There were 13 deaths, which shows a mortality of 5½ per cent.

There were faucial, 63, no deaths; laryngeal, 20, 2 deaths; fauces and larynx, 50, 3 deaths; faucial, nasal, and laryngeal, 14, 7 deaths; faucial and

*Codex Medicus, Philadelphia, September, 1895.

2. The day of the disease on which treatment was commenced.

Any treatment when begun early is sure to be successful in almost all disease, is an aphorism which will not hold good in diphtheria. Though Lennox Browne, Winters, Rosenbach, and some others of those antagonists to serum-therapy are contrary. As a matter of fact, prognosis in diphtheria is almost an impossibility. We know how in an hour cases can become septic, or how in a moment a sufferer from diphtheria may perish. No matter how bright the outlook may be at the beginning or how mild a case it might be, no one can predict an end. Therefore, any reason given against the assertion of its advocates—"the earlier antitoxin is used the more certain its success"—is fallacious and misleading. "The following figures (A and B) show that there is no warrant for special application of so general a law to the case of the serum remedy, the dates on which serum commenced corresponding so closely." (Lennox Browne.) I think there is warrant for special application.

Day of commencement of treatment.	Series A. Number of cases.	Series B. Number of cases.	My own number of cases.
1	2	2	43
2	29	24	84
3	22	32	61
4	20	17	19
5	8	9	4
Over 5	19	10	11

Browne makes this assertion: In hospitals for diphtheria, where it is the rule for nurses who have the least symptom of sore throat to present themselves to the medical superintendent for immediate examination, and where the disease is, therefore, attacked at once, a fatal result is almost unknown, and this under the former method of treatment. In the hospital where these observations were made, 42 cases of diphtheria have occurred in the staff during the last five years without a fatal result. I wish I could give some statistics of the hospitals in comparison to this. In my own practice at present I immunize the nurse, and accomplish the same purpose.

3. The following figures show the prolongation of life in cases with fatal results.

Day of death.	Number of deaths.		
	Series A.	Series B.	My own statistics.
Within 24 hours.....	11	3	7
2d day.....	2	1	4
3d ".....	4	3	1
4th ".....	3	4	0
5th ".....	1	2	0
6th ".....	3	1	0
7th ".....	1	1	0
8th ".....	1	4	0
9th ".....	0	1	0
10th ".....	1	0	0
16th ".....	0	1	0
21st ".....	0	1	0
27th ".....	0	0	1
32d ".....	0	1	0
30th ".....	0	1	0

4. The site of membrane is to be considered an important indication of the series of cases, and although Series A has fewer examples of nasal diphtheria—the most fatal form—*per contra*, it has many more examples in which membrane extended to the larynx and a larger number of tracheotomies. (Lennox Browne.) I might say the same of my series, with the difference of intubation for tracheotomy, where intubation or tracheotomy was not necessary, all laryngeal cases recovered; so much for statistics:

Site of membrane	Series A.	Series B.	My own
Fauces.....	60	65	63
Larynx.....	2	0	20
Fauces and larynx.....	16	3	50
Faucial and nasal.....	17	28	6
Faucial, nasal and laryngeal.....	1	2	14
Nasal.....	1	1	0
Hard palate.....	0	1	0
Faucial and palatal.....	1	0	56
Faucial and buccal.....	1	0	13
Faucial and vulva.....	1	0	0

Browne adds: "With regard to nasal diphtheria, whether in association with the fauces or larynx, or both, we have found in 1000 cases, tabulated with regard to site and other items of interest, that this variety was fatal in 67 per cent., and in the present comparison we find in Series B a total of 31 cases of this class, 16 of which ended fatally—in other words, 50.16 per cent. This in favor of serum, for under the older method of treatment, as represented in Series A, out of a total of 19 cases 12 died, or 63.15 per cent." My own statistics show but 20 cases, of which 7 died—a mortality of 35 per cent. Our conditions may, however, have been different, still it shows by Browne's own figures the value of serum-therapy.

"In the cases in which the larynx was involved, in Series A., 7 died without operation out of a total of 18; these included 1 case which died within twenty-four hours of entrance to the hospital, intubation having been per-

formed previous to admission; 4 tracheotomies were performed, of which number 2 died.

"In Series B there were 5 cases of laryngeal diphtheria, and of these 2 died; in 1 of the fatal cases tracheotomy was performed. These numbers are certainly too small to deal with, but evidence from other sources is distinctly in favor of serum treatment with regard to laryngeal diphtheria." (Lennox Browne.)

In my statistics there were 84 cases of which 12 died; 14.34 per cent. 31 were intubated, of which 5 died; 16.23 per cent. I think in laryngeal diphtheria the specific action of antitoxin can be proven. In a former paper at Chambersburg, Pa., before the State Medical Society (*Medical News*, June 8, 1895), I pointed out this fact; further experience has more firmly impressed this upon me. Besides, in those cases intubated antitoxin exerts such a specific action that the length of time a tube should remain in the larynx can be known to a certainty. Where formerly we never could tell when the tube should be removed, we permitted it to remain—except where it was removed by coughing—at least one week before we thought of removing it. Now, on the fourth day all tubes are removed, and in the majority of cases reinsertion is unnecessary. The same was noticed by Bökai, whose cases I also quote.

5. *The day of treatment on which the membrane commenced to separate:*

Day.	Series A (50 cases). 10 or 20 per cent.	Series B (100 cases). 1 per cent.	My own (222 cases). 25 or 11.25 per cent.
1	13 or 26	28	51 or 23
2	18 or 36	36	72 or 33
3	7 or 14	14	78 or 35
4	2 or 4	2	1
5	0	1	0
6	0	1	0
7	0	1	0
8	0	1	0
9	0	1	0
10	0	1	0
11	0	1	0
12	0	1	0
13	0	1	0
14	0	1	0
15	0	1	0
16	0	1	0
17	0	1	0
18	0	1	0
19	0	1	0
20	0	1	0
21	0	1	0
22	0	1	0
23	0	1	0
24	0	1	0
25	0	1	0
26	0	1	0
27	0	1	0
28	0	1	0
29	0	1	0
30	0	1	0
31	0	1	0
32	0	1	0
33	0	1	0
34	0	1	0
35	0	1	0
36	0	1	0
37	0	1	0
38	0	1	0
39	0	1	0
40	0	1	0
41	0	1	0
42	0	1	0
43	0	1	0
44	0	1	0
45	0	1	0
46	0	1	0
47	0	1	0
48	0	1	0
49	0	1	0
50	0	1	0

6. *The day on which the throat was declared free of membrane:*

Day.	Series A.	Series B.	My own.
1	4	1	17
2	13	4	71
3	14	9	73
4	14	18	39
5	18	18	7
6	8	10	5
7	6	2	5
8	5	1	1
9	1	1	1
10	1	1	0
11	1	0	1
12	0	2	0
13	0	2	0
14	0	2	1
15	0	2	2
16	0	1	0
17	0	1	0
18	0	1	0
19	0	1	0
20	0	1	0
21	0	1	0
22	0	1	0
23	0	1	0
24	0	1	0
25	0	1	0
26	0	1	0
27	0	1	0
28	0	1	0
29	0	1	0
30	0	1	0
31	0	1	0
32	0	1	0
33	0	1	0
34	0	1	0
35	0	1	0
36	0	1	0
37	0	1	0
38	0	1	0
39	0	1	0
40	0	1	0
41	0	1	0
42	0	1	0
43	0	1	0
44	0	1	0
45	0	1	0
46	0	1	0
47	0	1	0
48	0	1	0
49	0	1	0
50	0	1	0

7. *Skin eruptions and joint pains.* These symptoms were known to Behring, who (*Das neue Diphtheriemittel*, Behring, Berlin, O. Häring, 1894) says it might be due to the serum, but not to the antitoxin. He would investigate this matter and see what the reasons were. Probably the serum may have been used too soon before the Ac. Carbol. had settled. At any rate, I cannot see anything dangerous in these symptoms, as they pass so rapidly away without treatment. Browne saw eruptions frequently, and in his series of cases saw 4 cases of joint pains. In my series eruptions were noted 32 times, joint pains 3 times.

8. *Adenitis* was observed in 18 cases in Series A and in 28 cases in Series B. In my cases it was noticed 14 times. In Browne's statistics the proportion of cases which went on to suppuration was about equal in the two. As far as I have learned no case suppurated. In connection with this question of suppuration, Browne mentions that there were 2 cases of abscess at the site of injection. We have never noticed any.

9. *Otorrhœa* was never noted, but *ozœna* was in our cases.

10. *Renal complications.*

a. *Albuminuria* was found by Browne 38 times in Series A and 50 times in Series B. It was noted in my cases 26 times. This, however, may be incorrect, as many of the cases were not examined.

b. *Anuria* was noted once. It was noted twice in Series A and 7 times in Series B.

c. *Nephritis* was not noted in this group of cases. In Series B the 7 cases that perished from anuria, 5 of them were proved to have nephritis by post-mortem examination.

11. *Heart failure* was not so specially noted in this group. Browne notes 4 cases in his Series B. Of other causes of death in Series B, 6 were due to bronchopneumonia, and 1 to septic peritonitis. Broncho-pneumonia was the cause of 1 death in my group. Sepsis the cause of several.

12. *Paralytic sequelæ.* 14 per cent. of cases in all cases, including Series A and B, is noted by Browne. In our group it has occurred 16 times. Baginsky remarked at Munich that "paralysis is

more frequent under antitoxin than before." Lennox Browne does not think so by his series, nor is such the fact by mine.

It is to be regretted that the experience of Lennox Browne was such as to impress him unfavorably. His paper, from which I quote so largely and the style which I follow so closely, impressed me as no other monograph on this subject has. The methods of hospital treatment may in some way act contrary to our expectations, and on the whole be very disappointing. The only other hospital that I care to quote from—for it is the only one that I received an affirmative answer from—is the Boston City Hospital, South Department. I received from Dr. Calvin Gates Page, the interne, a short *résumé*: "They used since July 1st antitoxin produced by the Boston Board of Health on 113 cases. There have been 90 recoveries and 23 deaths. Of the 23 deaths, 15 were hopeless cases when admitted. Of the 98 cases that received seasonable treatment but 8 died, showing a mortality of less than 8 per cent., whereas formerly the mortality from diphtheria has been 50 per cent."

In the *Deutsche medicinische Wochenschrift*, April 11, 1895, is a report from Dr. Johann Bökei ("Meine Erfolge mit Behring's Diphtherie-heilserum," read before the Budapest Königl. Aerztevereins, February 9, 1895) of the Budapest Stephanie Kinder Hospital (Diphtheria Department.) This report is most interesting, as Dr. Bökei studied his cases as I mine. Seeking those symptoms upon which the antagonists of antitoxin lay such particular stress, the following is a brief summary:

Number of cases, 120; deaths, 31; 25.5 per cent. In cases not operated the mortality was 14 per cent. In those operated (intubation) the mortality was 43 per cent. The ages were: Under one year, 1 case; over one year, 22 cases; over two years, 22; over three years, 24; over four years, 18; over five years, 13; over six years, 6; over seven years, 7; over eight years, 2; over nine years, 1; over ten years, 1; over eleven years, 2; over 12 years, 1.

The variety of diphtheria was as follows:

Variety.	Cases.
Faucial.....	41
Faucial and nasal.....	13
Faucial and conjunctiva.....	1
Faucial and vulvitis.....	2
Laryngeal (not operated).....	14
Laryngeal (operated).....	49

His 31 deaths were in children of the following ages: Under one year, 1 case; over one year, 10; over two years, 7; over three years, 4; over four years, 3; over five years, 1; over six years, 1; over seven years, 3; over ten years, 1 case.

Of these deaths, 18 (therefore over one-half) were in the first two years.

Death occurred as follows: 1 case five hours after admission, 1 case 12 hours, 1 case eighteen hours, 2 cases twenty hours, 1 case twenty-three hours, 5 cases twenty-four hours, 1 case forty hours.

The cause of death was: Sepsis in 5 cases, descending croup in 13, pneumonia in 7, paralysis of the heart in 3, nephritis in 1, scarlatina in 1, tuberculosis in 1.

In all his cases Bökei saw not one sequel (paralysis of the heart, post diphtheria, paralysis nephritis), but all cases when cured recovered fully.

Bökei studied particularly albuminuria, and found it in 37 cases; the duration was: In 6 cases one day, in 5 cases two days, in 5 cases three days, in 6 six cases four days, in 3 cases five days, in 4 cases six days, in 3 cases seven days, in 1 case eight days, in 1 case eleven days, 1 case twelve days, 1 case thirteen days, 1 case twenty-two days.

The skin rash was noticed in 11 cases: 1 in three days after injection, 3 in six days, 1 in eight days, 3 in ten days, 1 in eleven days, 1 in twelve days, 1 in thirteen days.

The duration of the erythema was: In 4 cases one day, in 2 cases two days, in 1 case three days, in 2 cases five days, in 1 case seven days, in 1 case eight days.

In 11 cases the erythema disappeared 6 times, without any symptom, 5 times with fever, and 4 cases the fever was very high.

Bökei immunized 70 cases with success, and describes an epidemic in another department of the hospital (measles) where diphtheria infected

those so affected; 14 remaining cases were immunized without one outbreak of diphtheria.

Other statistics are familiar to you all. The journals are full of them. In the *Therapeutische Monatshefte*, July, 1895, page 372, most of the late cases are described of those occurring in Europe. G. C. Crandall, St. Louis, Mo., (*Journal American Medical Association*, July 27, 1895), gathered the statistics to that date, including Heidelberg, Prague, Vienna, Berlin, Munich, Leipsic, Halle, Paris, London, New York, and Boston. The whole number of cases were 4022; mortality, 17.1; previous mortality, 42.0.

As those whose records have placed themselves as opposed to the serum-therapy speak of these statistics as misleading (Dr. C. L. Schleich and Dr. A. Gottstein, "Immunität, Infections Theorie and Diphtherie Serum," Berlin, 1894) and false; that many cases are reported now that would have never been reported, and were of mild character, hence the increase of cures. I have investigated this subject further and found that whilst, in truth, there may be some foundation for this assertion, other cases not reported, and the most serious, (membranous croup) would equalize this. Schleich gives the reason: a fear of quarantine and its necessary evils as the cause. Dr. Welsh, Philadelphia, told me different: his theory was to swell the statistics. However, as it is now conceded that membranous croup is diphtheria, and should so be reported, I asked Dr. Roger S. Tracy, Register of Records, New York, for a report of deaths from croup for New York, and Dr. S. H. Durgin, Chairman Board of Health of Boston, for the deaths from croup for Boston. These returns I have added to the former returns received, and I therefore give what I think should have been the true statistics.

Deaths from croup for January, February, March, April, May and June.

	New York.	Boston.
1886.....	478	37
1887.....	563	55
1888.....	401	73
1889.....	369	66
1890.....	304	43
1891.....	307	23
1892.....	361	31
1893.....	357	39
1894.....	338	28
1895.....	187	36

REPORT OF DEATHS FROM CROUP. NEW YORK
BOARD OF HEALTH. Through Roger S. Tracy,
M. D., Register of Records:

Month.	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895
January.....	97	115	92	69	46	66	61	90	64	40
February.....	87	93	77	67	59	49	68	63	50	33
March.....	102	105	76	69	56	67	62	66	62	36
April.....	72	98	51	61	65	50	76	49	61	32
May.....	56	95	57	61	44	44	63	56	65	28
June.....	64	57	48	42	34	31	31	33	36	18
July.....	60	27	28	35	28	37	52	30	22	28
August.....	49	22	29	25	26	22	30	41	20	29
September.....	48	47	37	38	24	48	42	28	21	
October.....	89	67	32	43	32	63	68	50	29	
November.....	126	82	43	55	53	59	57	37	41	
December.....	118	81	69	40	54	70	60	45	40	

REPORT OF DEATHS FROM CROUP. BOSTON
HEALTH DEPARTMENT. Through S. H. Durgin,
M. D., Chairman Board of Health:

Month.	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895
January.....	7	20	18	12	13	6	7	9	8	10
February.....	4	12	14	12	5	3	6	9	5	10
March.....	13	6	14	14	8	5	5	9	4	5
April.....	1	7	8	13	6	2	5	4	6	4
May.....	5	8	11	9	5	6	5	5	1	3
June.....	7	2	8	6	6	1	3	3	4	4
July.....	7	2	2	4	1	1	2	2	4	1
August.....	5	3	8	2	1	2	1	6	5	
September.....	6	3	3	11	4	1	3	1	1	
October.....	10	9	5	11	2	6	6	5	7	
November.....	14	10	13	8	5	7	12	4	6	
December.....	15	12	15	17	5	13	12	13	10	

Since 1890 diphtheria and membranous croup have been considered one in Boston; and in New York I think 1892 was the year where croup was declared contagious. The altered percentages are as follows:

	NEW YORK.		BOSTON.	
	Without croup.	With croup.	Without croup.	With croup.
1886 . . .	47 $\frac{1}{2}$	58.9	27 $\frac{1}{2}$	31.5
1887 . . .	43 $\frac{1}{2}$	52.9	27 $\frac{1}{2}$	32.4
1888 . . .	29 $\frac{2}{5}$	36.5	34 $\frac{1}{2}$	41.3
1889 . . .	26 $\frac{1}{2}$	32 $\frac{1}{2}$	27 $\frac{1}{2}$	32.1
1890 . . .	27 $\frac{1}{2}$	34.8	25 $\frac{1}{2}$	

	Croup and diphtheria Reported together under diphtheria.	
1891 . . .	26 $\frac{1}{2}$	25 $\frac{1}{2}$
1892 . . .	27 $\frac{1}{2}$	32 $\frac{1}{2}$
1893 . . .	31 $\frac{1}{2}$	30 $\frac{1}{2}$
1894 . . .	26 $\frac{1}{2}$	30 $\frac{1}{2}$
1895 . . .	17 $\frac{1}{2}$	15 $\frac{1}{2}$

These statistics and cases explain themselves. What conclusions are drawn therefrom can easily be given. Clinical evidence is in favor of antitoxin, notwithstanding the contrary opinions expressed. For the different monographs upon this subject I am very much indebted to my cousin, Dr. A. Baer, of Berlin, who has also furnished me with my Behring's antitoxin. I am also under obligations to Dr. Roger S. Tracy, of the New York Board of Health, and Dr. S. H. Durgin, of the

APPENDIX.

REPORT FROM DR. ROGER S. TRACY, REGISTER OF RECORDS OF BOARD OF HEALTH FOR NEW YORK.

Diphtheria. New York.	1886		1887		1888		1889		1890		1891		1892		1893		1894		1895	
	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned
January.....	945	155	1381	296	1862	218	2887	290	1343	119	1360	90	1555	138	1449	149	2839	286	2687	179
February.....	134	149	134	170	1862	218	134	167	1343	119	1360	90	1555	138	1449	149	2839	286	2687	142
March.....	134	149	134	170	1862	218	134	167	1343	119	1360	90	1555	138	1449	149	2839	286	2687	142
April.....	818	134	1389	186	2013	173	2063	208	1270	122	1108	87	1299	140	1515	175	2805	216	2727	154
May.....	708	133	1387	154	1100	173	973	164	708	107	900	102	809	90	1265	158	1761	180	1386	155
June.....	708	133	1387	154	1100	173	973	164	708	107	900	102	809	90	1265	158	1761	180	1386	155
July.....	708	133	1387	154	1100	173	973	164	708	107	900	102	809	90	1265	158	1761	180	1386	155
August.....	708	133	1387	154	1100	173	973	164	708	107	900	102	809	90	1265	158	1761	180	1386	155
September.....	708	133	1387	154	1100	173	973	164	708	107	900	102	809	90	1265	158	1761	180	1386	155
October.....	708	133	1387	154	1100	173	973	164	708	107	900	102	809	90	1265	158	1761	180	1386	155
November.....	708	133	1387	154	1100	173	973	164	708	107	900	102	809	90	1265	158	1761	180	1386	155
December.....	708	133	1387	154	1100	173	973	164	708	107	900	102	809	90	1265	158	1761	180	1386	155

REPORT FROM DR. S. H. DUBOIN, CHAIRMAN BOARD OF HEALTH OF THE HEALTH DEPARTMENT, BOSTON, MASS.

Diphtheria. Boston.	1886		1887		1888		1889		1890		1891		1892		1893		1894		1895	
	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned	Cases reported	Deaths returned
January.....	122	29	128	38	112	35	179	59	263	63	80	16	102	28	162	49	185	61	340	55
February.....	104	25	96	24	80	23	150	42	189	49	71	18	108	31	114	32	128	46	294	55
March.....	110	25	96	24	80	23	150	42	189	49	71	18	108	31	114	32	128	46	294	55
April.....	104	25	96	24	80	23	150	42	189	49	71	18	108	31	114	32	128	46	294	55
May.....	104	25	96	24	80	23	150	42	189	49	71	18	108	31	114	32	128	46	294	55
June.....	73	22	71	22	101	37	136	54	144	39	81	24	107	32	111	32	128	46	294	55
July.....	94	30	88	22	110	37	165	57	114	28	81	16	107	32	111	32	128	46	294	55
August.....	75	22	53	14	92	29	99	32	75	28	31	8	76	19	88	30	138	41	268	40
September.....	85	24	53	14	95	31	99	44	75	19	40	8	79	23	102	28	154	60		
October.....	133	38	112	31	143	51	187	49	75	18	78	11	144	31	89	31	249	70		
November.....	111	34	100	36	135	51	190	56	75	18	41	27	144	35	194	40	450	106		
December.....	140	39	130	45	172	53	174	59	117	33	127	35	175	52	183	60	469	99		

¹ Cases reported are only made up by quarters, not months.² Approximate for two months (July and August). August not made up yet; probably 6 or 8 more.

Boston Board of Health, for their kindness in furnishing me with statistics, also to Dr. Page, of the Boston City Hospital, South Department, for his statistics.

I am in favor of the antitoxin treatment of diphtheria; as an evidence of the correctness of my position I have

given the reports of numerous physicians, the reports of three different hospitals, the extended reports of the cities of Boston and New York, and the combined statistics of Heidelberg, Prague, Vienna, Berlin, Munich, Leipzig, Halle, Paris, London, New York and Boston. Philadelphia has no statistics to present.

SUICIDE IN ITS MEDICAL AND ITS MORAL ASPECTS.

It has been noted elsewhere that a tendency to suicide has recently been somewhat unusually prevalent. In *The Lancet* of July 28, 1894, we suggested that this tendency might be capable of partial explanation on physical grounds, and in a later issue (August 11th) we published a letter by Dr. Alexander Haig bearing upon the same subject. The regular, though happily never frequent, connection between solar heat and this form of crime has been repeatedly observed, and may, without undue straining of logical conditions, be accepted, at all events as far as it goes, as a working hypothesis founded on accurate observation. When we go further and seek to explain the hypothesis itself, however, we are still conscious of the insufficiency of our data. The theory by which Dr. Haig would associate mental depression with blood vascular tension due to uric acid is indeed helpful in its measure, as it is certainly ingenious. The measure of assistance toward a sufficient explanation is nevertheless in both cases very meagre. It is evident that in the case of most persons a wide desert of despondency intervenes between the state of mind which corresponds to a hard pulse and overlaid tissues and the last fatal folly of despair. Save in the case of insane or weak-minded persons, it is hardly possible to conceive that men can be impelled to suicide by purely physical conditions, which are, after all, so common as

hardly to be regarded as abnormal except by the scientifically educated mind. We would by no means overlook the necessity of treating these cases by appropriate means, but we are none the less assured that the reckless will which induces men to convert a weariness of life into a purpose of self-destruction does not depend upon mere atmosphere or mal-excretion. Where they are free to operate, the reserves of moral sense, thought, and resolution have either been previously exhausted or have not been drawn upon. A feeling of personal loss or a morbid fear of such has obliterated the sense of human relationship. The interest of dependent or associated neighbors and of relatives is forgotten. Self-love, not social duty, is the impelling force. We have not much hope that persons in this mood will be greatly influenced by changes of weather or by purely physical treatment. We would rely more upon the full and frank assertion of the duty and utility of all human beings to each other and to the Providence essentially friendly to men which called them into being. Suicide is, after all, a moral failure, an evidence of the mastery of mistrust, an act of rebellion against the authority of patience. Obviously no drug, no social reform even, can effectually cure it, unless they be aided in the first place by a frank and full recognition of man's moral relation and responsibility. — *The Lancet*.

COMMUNICATIONS.

POST-ALCOHOLISM.*

S. V. CLEVENGER, M. D., CHICAGO.

Ethyl alcohol, spirit of wine, is commercially assumed to be the base of intoxicating drinks, and the purest of these is capable of working great havoc when abused, but the demand for cheap liquor in vast quantities substitutes for portions of the less harmful ethyl or vinic alcohol what is known to chemists as the poisonous amyl alcohol (potato spirit or fusel oil). The aroma or bouquet of liquors is largely due to certain ethers of the more poisonous amyl and butyl alcohols, notably the acetic and valeric; then super-added, all too often, by distiller, rectifier, wholesaler, and especially by the retailer, are sophistications, flavors and perfumes for the purpose of cheapening the resulting compound, which, by the time it reaches the average consumer, contains in addition to the alcohol diluents to increase bulk, articles to give it false strength, fictitious appearance, odor and taste.

In the English Licensing Act of 1872 (35 and 36 Vict. c. 94) there is a schedule of substances called "deleterious ingredients," found to have been used in adulterating intoxicating liquors; they are cocculus Indicus, common salt, copperas, opium, Indian hemp, strychnin, tobacco, darnel seed, logwood, salts of zinc or lead, and alum. Since then, ingenuity and cupidity have extended the list indefinitely among dye materials, both organic and inorganic; and there are also added correctives of acidity, such as litharge, lime, soda, potash; astringents, like catechu, oak bark and aloe leaves; earths for discolorizing; sweetening agents, and ethers for flavoring. Most of these articles are unwholesome, to say the least, and tend to debilitate and otherwise set up depraved bodily states.

Chronic alcoholism in its most obvious

features is a condition of functional poisoning, such as is seen in its production of lethargy, stupidity and acute narcosis. Less noticeably, but gradually, it operates as a tissue poison, affecting parenchymatous elements, particularly epithelial and nerve structure, if not to a greater or lesser degree all the cellular components of the body. A slow degeneration is produced until the blood vessels are involved in thickening and fibroid changes. Oxidation of tissue is checked, since alcohol is consumed in place of the fat, leading to fatty changes, which may advance to general steatosis.

Dr. Magnus Huss, of Stockholm, in 1849 first prominently directed the attention of physicians to the subject of alcoholism, a term he was the first to use. He described the paralytic and anæsthetic forms of chronic alcoholism, also later referred to by Hammond ("Diseases of the Nervous System," 1881), Ross ("Diseases of the Nervous System," 1885), and other neurologists.

Gowers ("Diseases of the Nervous System," vol. i, 110, *et. seq.*, 1892) under the heading "Multiple Neuritis," gives still more recent details of these distressing consequences of drinking alcoholics.

Magnan (*De L'Alcoolisme des diverses formes du Delire Alcoolique, et de leur traitement*, 1874), Virenque, Hammond and others observed the occasional loss of sensation involving only one lateral half of the body, as in hysteria. The other special senses are generally implicated. Thus the patient loses the sight of one eye; cannot hear with one ear; can taste with only half the tongue; and smells with but one nostril.

Gowers (op. cit. 119), states that alcoholic polyneuritis is most frequently met with and preponderates over all

(* Jour. Am. Med. Ass'n., October 18, 1895).

other forms of nerve inflammation. It results chiefly from the stronger forms of alcoholic drinks, and especially from spirit drinking. It is more common among those who take small quantities frequently, than among those who indulge in an occasional spree, probably because the total quantity is greater by the former. It is far more frequent among women than among men; probably three times as frequent. Other causes often coöperate with alcohol in exciting polyneuritis, especially exposure to cold, and, in the poor, insufficient nourishment.

The symptoms consist in motor weakness, sensory disturbance and incoördination. The weakness involves first and chiefly the flexors of the ankle and extensors of the wrist and fingers in the forearm; the result is wrist-drop and foot-drop. Other muscles suffer in severe cases. The sensory symptoms are tinglings, pains, varying in place and degree, tenderness and loss of cutaneous sensibility. The incoördination resembles that present in the slighter forms of locomotor ataxia.

Neuritis is the most common finding in chronic alcoholic autopsies.

Catarrh of the stomach with furred tongue, heavy breath, a feeling of epigastric distress or "sinking," impaired appetite and constipation are ordinarily experienced.

The liver may undergo changes leading to various forms of cirrhosis. Sometimes moderate drinking may reveal a special liability to hepatic cirrhosis, while, on the other hand, hard drinking for thirty years may leave the liver nearly intact.

The stomach and liver disorders of drunkards produce dilated veins of the cheeks and nose, causing suffusion of those parts; acne rosacea. The eyes are watery, the conjunctivæ hyperemic and often tinged with bile.

Formad claims that the kidneys are hypertrophied without other change as a rule, and Guy's Hospital Reports verify this finding. Pitt places this as occurring in 43 per cent. of hard drinkers, and where the typical granular kidney occurs it is indirectly caused by arterial changes. (Osler, "Practice of Medicine," 1001, 1892).

The greatest variability in general

manifestations can be found in different patients amounting to idio-syncrasies in particular cases, and in other patients are classifiable into groups of a greater or less number.

The organic changes seem to be erratic, but are according to the resistance of organs. As a forerunner of serious alterations in the spinal cord, neuritis is not a simple and harmless disorder.

Magnan has demonstrated an alcoholic paraplegia in which Buzzard found electrical degeneration reaction. Some cases end fatally, though Bramwell ("Diseases of the Spinal Cord," 307, 1884), considers it for the most part functional. Broadbent's description (*Medical Times and Gazette*, February 16, 1884), in which myalgic pains, hyperesthesia and double wrist-drop is included, should be compared with the pathologic changes found by Eichorst, of Zurich (*London Lancet*, May 19, 1888), attending alcoholic neuritis, in cases of incoördination followed by paraplegia and wrist-drop, tenderness of muscles, anesthesia, abolition of reflexes, and, finally, vesical and rectal paralysis. The pathologic anatomy consisted in cord hemorrhages in the dorsal gray, thickened, blood vessels, degenerated and atrophied tibial and radial nerves with axis cylinders destroyed; the peripheral extremities were worst diseased; connective tissue proliferations of endo- and perineurium and inflammatory changes in their vicinity. A muscular atrophy was secondary to the neuritis, the nerve sheath inflammation extended to the interstitial muscular tissue. Bramwell notes that myelitis and other forms of organic disease may be caused by alcoholic excess, hence the paralysis may be permanent and incurable.

The enfeeblement of judgment and will may finally end in dementia.

Post-mortem does not show any particularly characteristic changes in the nervous system invariable for all cases of chronic alcoholism, showing that resistance is greater in some than in others. Sometimes hemorrhagic pachymeningitis is observed with thickening and opacity of the pia-arachnoid membranes and wasting of the convolutions, or there may be a chronic encephalomeningitis with membrane adhesions, but most of these pathologic states are

in advanced cases of alcoholism, the more incorrigible sort, as can be readily believed when we note the fact of many chronic drunkards having been reclaimed and restored to the world about as they were before the habit was formed. The older the patient and the longer the addiction, the greater probability would there be of finding organic changes in the brain and its envelopes and blood vessels.

Many chronic alcoholic insane exhibit remarkably close resemblance of symptoms to those commonly found as the result of injury to the brain, in traumatic insanity. These symptoms are: changes of character, lapses of memory, headaches, sleeplessness, irritability, suspiciousness, long apparently lucid intervals, homicidal and suicidal impulses, delusions of persecution. These peculiarities appearing in the alcoholic insane long after being incarcerated in an asylum, during which time no intoxicating liquor has been taken by them, point clearly to organic brain destruction, accomplished from within, but as severe and hopeless as when the brain had been injured by a blow upon the head, with subsequent extension of inflammation to the membranes and cerebral tissues.

It is when the mental degradation which temporarily occurs in alcoholism becomes permanent that chronic alcoholic insanity may be said to exist. During the acute stages there may be hallucinations, illusions and delusions which disappear on recovery from the blood poisoning; the persistence of some of these states betokens permanent damage to the mental apparatus, and the brains of the chronic alcoholic insane invariably exhibit evidences of destructive organic changes.

It is with astonishing frequency that jealousy of the wife or mistress exists to an exaggerated degree in most forms of drunkenness, from simple suspicion to delusions of marital infidelity, which in extreme cases may originate hallucinations of gross amours being carried on in the patient's presence.

It sometimes happens that the alcoholic may have grounds for suspicion in facts, but this does not lessen the delusional origin of his accusations. A frequent outcome of the notorious marital

unhappiness thus caused is a brutal wife murder, the body of the victim sometimes being found hacked to pieces or partly destroyed by fire. The insane fiend may make but a stupid attempt to escape, or none at all, either expressing surprise at, or doubt of the reality of the event, or attempting justification in explanations.

The memory and intelligence suffer gravely, though not always obviously, for it may require considerable familiarity with the former peculiarities of the patient to determine the degree of mental impairment, and comparisons of his past and present are often possible only when he has been under observation for a greater or lesser period; in some cases months may be necessary. He may be able to attend to routine duties, but is inconstant and easily diverted. The reasoning powers are lessened in varying degrees, and many such changes are not determinable off-hand.

Delusions, particularly such as relate to the wife's unfaithfulness, are fixed, but not systematized, for his explanations concerning them are vague and illogical. There is a melancholic persecutory tinge to all his ideas.

Some cases of chronic alcoholism on the verge of chronic alcoholic insanity experience auditory hallucinations of mandatory and accusatory kinds, and these may become so distressing as to lead to suicide, homicide, or insane acts generally. The dangerous character of insanity with auditory hallucinations is fully recognized by alienists.

In asylums for the insane will be found many cases of insanity that have been complicated with alcoholism, particularly a peculiar form called traumatic insanity, the result of head injuries, after the receipt of which there is a remarkable tendency to drink to excess, and the alcoholism may be combined with the traumatic insanity in every conceivable degree, sometimes outrunning the original psychosis in its influence for evil. Epileptics are sometimes incorrigible drunkards, and epilepsy may appear for the first time when an alcoholic has abstained from liquor for some unusual length of time. In such cases there may have existed petit mal, unnoticed previously, or even convulsions may have occurred at night,

during sleep, and after stopping the use of liquor the fits have appeared during the day, through the alterations in habits. Any other form of insanity may have, to some degree, the impress of alcoholism to modify it, and where this complication is extreme, as it is frequently in the head injury cases mentioned (sunstroke victims fall into this category), there are characteristics in common with those of chronic alcoholic insanity that are well recognized by asylum physicians and that often cause considerable annoyance.

Soon after the commitment of a chronic alcoholic insane case to the asylum or hospital, he appears to improve remarkably, if he escape the consequences of his last debauch and does not die of pneumonia or exhaustion; locked up at first in a ward, he is sooner or later trusted about the grounds and can be made very useful as a workman of some sort. He may refrain from asking for a discharge for a long while for the purpose of convincing the superintendent of his recovery, but unless the patient conceal his delusions, as many insane do, he is liable, with a little questioning or in his letters to friends or relatives, to reveal the permanency of his delusions of persecution. The writings of some of these apparently sane alcoholics contain the foulest abuse of mother, wife, or children, without the least warrant for it in their former treatment of the patient.

Sometimes a weak-minded relative may be found espousing the cause of the "unjustly detained" alcoholic, or well-meaning but misguided friends may satisfy themselves of the "recovery," and even resort to habeas corpus proceedings to secure the patient's discharge.

Under the watch and restraint of hospital sojourn and their gradual admission to parole, with occasional breaks thereof, many of these patients assume, to all appearances, their original mental condition. To the superficial observer they are perfectly sane; many work cheerfully in the shops and talk quite intelligently about the possibility of relapses if allowed to go. But a large percentage are importunate, and these are the least to be trusted, for their anxiety to flit is born of their inability to gauge their feeble will power to resist

temptation. If they are discharged, back they come, not infrequently with newspaper and other criticism of the hospital authorities for having liberated such a dangerous character. These same critics are just as liable to write up sensational comments on the injustice of keeping perfectly sane persons at the behest of relatives who, the critics affirm, have some pecuniary motive in the patient's being deprived of liberty. Nor is the trouble taken to inquire whether the county is charged with the case as a pauper or not.

When habeas corpus proceedings are begun, the natural inference is that there must be some malign reason for the detention. Probably it is just as well in the long run that the public should be suspicious, but the conscientious hospital physicians are put to unnecessary trouble in explaining matters of pathology and general medical experience to laymen who are much more familiar with business affairs.

The hospital physicians will congratulate themselves that cases of this kind are improving, and discuss the advisability of trusting them on parole, preliminary to letting them go home on trial, but the records of the cases suggest caution, such as domestic horrors, including attempted wife murder, brutality to children, improvidence to a criminal degree, the wife usually faring the worst, though when he is not drinking she claims her husband to be the "best and kindest of men."

Notwithstanding all this, such near relatives often beset those in charge of the hospitals to liberate their husbands, sons or fathers; poor ignorant creatures, because they can only see the hopeful side of matters for themselves, and can not appreciate the vast fund of information possessed by the doctors as to the frequently disastrous consequences of too early discharges, or, sometimes, any discharge at all.

The alcoholic insane have been apparently sane while at the asylum, and even after ten years' trial when they were allowed to return home they would resume all their bad habits, such as furniture smashing, chasing the family into the streets with axes or knives, and after being returned to the asylum in a maniacal state they would resume all

their apparent sanity and sweetness of disposition, which arouse the suspicion of the visitor that some unworthy motive on the part of somebody withholds so useful a person from society at large.

Among the sadly comic instances of this kind appear liberations after carefully weighing probabilities and enduring the threats, entreaties and promises of the family and patient, against the better judgment and misgivings of the physicians; and when something does occur from the risk, as too often happens, forthwith not only the public, but the relatives censure the weakness of the doctors for having listened to them at all.

A washerwoman, who had about as much experience with the inner life of a large city as some physicians acquire, used to dub the defects produced by alcoholism as "street angels and home devils." Much danger to the community exists in the seeming sanity of such cases. There is no provision for their incarceration on the ground of the great liability to be homicidal, and when they do commit a murder it is a difficult matter for the public to comprehend the insanity during the quiet stage induced by imprisonment and liquor deprivation.

Alcoholic dementia is simply a secondary or terminal dementia of profound type, that has usually supervened upon alcoholism, the intermediate stage of chronic insanity being often short, or having escaped notice altogether, as such; being merged from the general alcoholism. It is as permanent and incurable as any other secondary dementia. The organic brain and blood vessel changes in this, and other chronic alcoholic insane states often shorten the lives of patients; many succumb from pneumonia which proves so fatal to drunkards generally.

Post-alcoholic conditions are such as become evident during abstinence after the protracted use of liquor.

If the shock of abstinence is rallied from, we can then determine how much is left of the patient. Destructive changes in the brain may be, to an extent, masked by drinking; that is, the behavior of the patient may be erroneously ascribed to the drinking, when it in larger part may be due to brain

alterations produced by over-indulgence.

The extreme ground is taken that by whatsoever means recovery from habitual drunkenness is made, the health is never regained. Dr. Clum (*Quarterly Journal of Inebriety*, October, 1891, 382), observes that those who have been addicted to the excessive use of alcoholic beverages for a number of years, may be restored to a state of sobriety, but they are generally left with an entail of chronic disease which eventually ends their career. They die temperance men, but die as a result of disease contracted by the excessive use of liquor. The habit is abandoned and nature and remedies are given a chance to do their part toward reinstating the individual, but the vital organs have been injured beyond reparation.

This gloomy outlook for the "reformed" inebriate concerns a large percentage of cases, but is far from being universal. Drunkenness is not the only consideration; the health previous to and during the addiction should be regarded, aside from, as well as with, the drinking habit and its extent; the age, associations and conditions, such as exposure and immoral practices, as incidental or consequential matters, need consideration in ascertaining how far a breakdown is ascribable to drink or its stoppage.

Heart weakness that had previously been compensated to some extent by stimulants, whether created by their use or not, often becomes apparent in post-alcoholic life. Syphilis is known to have become modified and somewhat checked through alcoholic poison acting upon the syphilitic poison, and when this antagonism ceases, the syphilis has become more virulent. Livers, kidneys, nerves and brains that have been structurally degraded cannot be restored by mere change of habit; indeed, paralytic states may become evident immediately after liquor withdrawal through the shock of readjustment to new vascular workings. For example, when an alcoholic neuritis with membrane thickening and beginning spinal cord myelitis has been inaugurated through alcoholism, the sudden change in the circulation, caused by abstinence, will inevitably render the physical consequences of

such inflammatory and neoplastic states more apparent. Pressure symptoms, debility, and marked sensory and motor impairment are liable to occur, from monoplegias to complete paraplegia.

Tremens begins during the abstinence of drinkers, and from circulation changes in the brain, temporary sobriety causes a dazed, bewildered mental state in the hard drinker. Even were the craving destroyed, and were the will-power to resist drinking to be imparted, by any means, too often the inebriate then finds himself so completely out of his environment, so changed are inner to outer relations as to what constituted his previous existence, that he rushes back to his former habits about as a fish would take to water, and for analogous reasons.

Hard drinkers are the first to succumb to epidemics, such as cholera and yellow fever, and abstinence merely uncovers the debased organic weakness that these epidemics co-operated with destructively.

After prolonged use of liquor, abstinence sometimes is followed by acute melancholia in which the delusions of that psychosis are commingled with some that are peculiar to alcoholic insanity. This depressed state seems to be owing to exhaustion of the system habituated to alcoholic sustenance, and not yet readjusted to the assimilation of proper food.

A demented condition, more or less profound, may set in from the same causes. A well-known stockyards millionaire, of Chicago, had, up to his sixtieth year, guzzled fusel oil in all its disguises as ethyl alcohol compounds, and a sharper, shrewder person was hard to find; but he abandoned his drinking suddenly, utterly and completely, and during the succeeding three or four years gradually became incapable of attending to business, presenting the apathy, memory loss and other characteristics of what was known as "primary mental deterioration," but which Voisin claims to be "atheromatous insanity," the blood vessel destruction found post-mortem justifying the designation. While this mental malady is often independent of alcoholic habits, its appearance as apparently connected with the stoppage of drinking is worth noting.

In those who indulge many years, and then quit drinking, the alteration in behavior is quite observable; they are certainly quieter, calmer, and while doubtless far better off than when stimulating, the general one is below what it used to be, or what it would have been had they not drank at all; meddling with fire must be at the expense of some scars. While atheromatous insanity may occur in the temperate, a condition like it, if not identical with it, could readily be conceived as consequent upon abstinence after long addiction, or the pathologic condition mentioned itself could be directly induced by alcohol, and persist, whether alcohol is or is not taken after the condition is instituted. The tendency to steatosis in the intemperate can be recalled in this connection and doubtless many cases of so-called dementia from abuse of alcohol may be found to be of Voisin's type of atheromatous insanity.

The hyperemic state of chronic alcoholism necessarily alters the cerebral circulation in various ways in many, but not in all cases, causing endarteritis, leucocytic exudation, neoplastic organization and capillary extravasation into the cerebral tissues comparable to the rosacea observable in some drunkards' cheeks and noses. In my autopsies of the alcoholic insane at the county asylum, I invariably noticed a rusty discoloration of the dura mater along the course of the superior longitudinal sinus, and other evidences of old inflammatory conditions, such as adhesions of the membranes and cerebral tissue of the convexity and basilar regions. The vascular and meningeal alterations varied in degree according to the patient's age. Where frailty of blood vessel organization existed congenitally, there was greater liability to pathologic change in such cases.

The finer mental coördinations in any one are maintained by effort; being the latest faculties acquired, and their tenure being so dependent upon full brain integrity, it is plain that the moral nature has been superimposed upon the less easily destroyed brute nature, through finer and weaker histologic arrangements acquired and inherited, demanding for their exercise the clearest kind of brain activity. Vitiating blood

quickly blots out these better but feebler functions for the time being, just as exhaustion is felt first in our weakest joints. So the moral nature, which is merely a higher intelligence, may depart when the seat of intellect is weakened by any cause, such as senility, drinking, insanity, arrest of debility, traumatism and some diseases.

When certain pathologic adjustments, involving imperfect compensations, occur, such as thickened arterial walls which resist the increased flow of blood, then a new plane of mental operation is established, which, if disturbed by change of habits, as by withdrawal of the customary greater heart impulse, it is but partially and inadequately recompensated by the pure blood. Practically, the adjacent cerebral tissue must suffer from anæmia to a greater or lesser extent, and where previously the blood was driven through disarranged avenues, it now makes its way feebly, and in some places not at all. Nor is this all; the sclerosed and otherwise changed tissue becomes a more prominent hindrance to function when the artificial nutrition and circulation is cut off. So the poor fool of a drunkard is too often thus "damned if he does, and damned if he don't" continue.

Summarizing post-alcoholic bodily and mental states, there may be found many organic destructive changes in the blood vessels, liver, nerves and brain, which were not so evident during the addiction, owing to the somewhat compensatory effect of the alcohol, and hence the masking of diseases.

The simple privation may kill through the weak heart losing its wonted stimulant, but such cases are not very common; debility is the most frequent consequence of "reform," but this is often a return to what preceded and may have led to the over-indulgence. Cerebral blood vessels subjected to engorgement are liable to rupture at any time where weak points exist, and fatty degeneration of vessel walls, induced by the liquor, may culminate in apoplexy, whether drinking is continued or not.

A single severe attack of delirium tremens may make profound changes for the worse in the future workings of the brain, and the typhoid stage of some

cases of delirium tremens show the ravages of the poison often in life-long sequelæ.

Chronic alcoholic insanity may make its first gross appearance after abstinence, enforced in jail or otherwise.

Necessarily, when liquor is withdrawn, a change for the better is ordinarily the rule, but such withdrawal in some cases may operate as a shock, and in all cases a readjustment of the entire physiologic make-up must occur. It is conceivable that epilepsy or insanity may find in such shock a potent exciting cause, and the whisky soaking is ample as a predisposing influence, when it can alter the brain structure, in time, as thoroughly as a contusion or a concussion.

But what the inebriate has drank, how long he has been drinking, and his power of resistance, associated diseases, hereditary and other tendencies, are to be taken into account; and with these it is surprising how large a number of heavy drinkers escape any obvious trouble due to such excesses. A well-known druggist of Chicago was a sot until his fortieth year, stopped drinking and died at seventy years, having built up a large business; while others, who had not taken half his risks with liquor, succumbed during or after ceasing their bad habits.

Post-alcoholic conditions, such as insanity, paralysis, weak heart, etc., that occur in a minority of cases after alcoholic disuse, only the most thoughtless or perverted could use as arguments against the stopping of drink; as the liquor, in most cases, produced the trouble which merely culminated after the habits were changed; such climax, being inevitable in any case, and impending, might have been reached earlier, or, in a graver form, had the inebriety continued.

In a few words, drunkenness is a constant menace to the mental and bodily health, and it is far safer to escape from its ravages, scarred and maimed, than to go on sooner or later to certain destruction. Though the vast majority may be rescued entire, or nearly so from intemperance, no one can tell what the chemic devil has left of him until months or years of sobriety have passed.

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PHILADELPHIA, SATURDAY, NOVEMBER 9, 1895.

EDITORIAL.

RELATION OF MEDICINE TO LIFE ASSURANCE.

Life assurance, during the thirty years past, has grown to immense proportions. The majority of the companies, being mutual and sharing the profits with their policy-holders, not only illustrate the genius of modern enterprise, but demonstrate the shrewd business foresight of the people in providing for those casualties to which human life is exposed.

The great wealth of such mutual companies has established them in public confidence as safe depositories and profitable avenues for the investment of surplus earnings. Having in their keeping other people's money, their trust capacity has imposed weighty obligations for throwing about their business every safeguard wisdom and experience can invent.

The forms of application and contract are prepared by the companies with great care and minuteness of detail. Every statement in the application must

be substantially true. The company stipulates that its liability shall depend upon the truth of the answers to all questions it has determined as prudent and wise precautions in accepting risks. And the applicant agrees to the prudence and wisdom, in the letter and spirit of their requirements, by accepting the test.

From the fact that the companies themselves, independent of and without consulting the insured, prepare the applications and agreements with such care and minuteness of detail, courts and juries, in their decisions of insurance cases, lean to the insured; where ambiguity exists, the insured gets the benefit. The policy issued purports by its terms to be made by the company in consideration of the representations made to them in the application for the policy. The interrogations put to the assured usually cover every conceivable phase of human disease. The an-

swers to these statements as to physical condition must be true. These answers constitute the bases of the contract for insurance, and any untrue or fraudulent answer or any suppression of material facts, renders the policy void.

The application for the insurance is part of the policy, and the answers therein contained constitute the bases of the contract. By the questions inserted in the application, the insurance company seeks for information bearing upon the risk which it is to take and the probable duration of the life to be insured.

It does not seek for information as to merely temporary disorders or functional disturbances having no bearing upon general health or continuance of life. Such restrictions would greatly limit the insurance business. Colds, for instance, are generally accompanied with more or less congestion of the lungs, and yet in such a case there is no disease of the lungs which an applicant for insurance would be bound to state. So most, if not all, persons will have, at times, congestion of the liver, causing slight functional derangement and temporary illness, and yet having regard to general health and the continuance of life, it may be safely said there is no disease of the liver. It is generally true that before any temporary ailment can be called a disease it must be such as to indicate a vice in the constitution, or be so serious as to have some bearing upon the general health and the continuance of life, or such as according to common understanding, would be called disease.

If the applicant for a policy for insurance has any affection amounting to disease of the kind mentioned in his application, his negative answer would be a material misrepresentation, no matter how mild the character of the affection.

One of the perplexing questions for the physician to determine is, what con-

stitutes sound health? It cannot mean absolutely perfect physical health. As a learned judge has expressed it: "We are all born with the seeds of mortality." The legal decisions bearing upon this point are numerous. Some of them would strike members of the medical profession as rather ludicrous. Probably the best and most applicable of dicta has been laid down in a New York decision:

"The epithet 'good' is comparative. It does not require absolute perfection. When, therefore, one is described as being in good health, that does not necessarily nor ordinarily mean that he is absolutely free from all and every ill which 'flesh is heir to.' If the phrase should be so interpreted as to require entire exemption from physical ills, the number to whom it would be strictly applicable would be very inconsiderable. In applying terms somewhat indefinite, reference should be had to the business to which they relate. This rule is very necessary when construing a language which, like ours, is defective in precision. The most important question in applications for life insurance is, whether the proponent is exempt from any dangerous disease—one which *frequently* terminates fatally. It is not usually deemed an objection that one has some slight physical disturbance, of which in all human probability he will soon be relieved, although it might possibly lead to a fatal disease. A slight difficulty, such as the sting of a bee, the puncture of a thorn, a boil, or a common cold, has sometimes induced complaints which have shortened human life; but this result is so infrequent and improbable that the mere possibility is disregarded in the business of life insurance."

There is a wide divergence of opinion as to the doctrine of irresponsibility from ignorance. There is much of sound reasoning in the following opinion:

"Looking into the application upon the faith of which the policy was issued and accepted, we find much justifying the conclusion that the company did not require the insured to do more, when applying for insurance, than observe the utmost good faith, and deal fairly and honestly with it, in respect of all material facts about which inquiry is made, and as to which he has, or should be presumed to have, knowledge or information. The applicant was required to answer yes or no as to whether he had been afflicted with certain diseases. In respect of some of those diseases, particularly consumption and diseases of the lungs, heart, and other internal organs, common experience informs us that an individual may have them, in active form, without at the time being conscious of the fact, and beyond the power of anyone, however learned or skillful, to discover. Did the company expect, when requiring categorical answers as to the existence of diseases of that character, the applicant should answer with absolute certainty about matters of which certainty could not

possibly be predicted? Did it intend to put upon him the responsibility of knowing that which, perhaps, no one, however thoroughly trained in the study of human diseases, could possibly ascertain?"

"What is meant by 'true' and 'untrue' answers? In one sense that only is true which is conformable to the actual state of things. In that sense, a statement is untrue which does not express things exactly as they are. But in another and broader sense the word 'true' is often used as a synonym of honest, sincere, not fraudulent."

In connection with this subject the questions which are of interest and which address themselves to the knowledge, skill, and integrity of the physician are too numerous and complex for discussion in brief space. The one criterion—the solid ground of all, that which gives to business its honor and all attained of worthy success—the one tie upon which civil society rests, by which it is held together, is the full recognition of the value and the strict adherence to moral obligation. Into this one all other obligations merge.

ABSTRACTS.

THE PROOFS OF PROGRESS.

GEORGE M. STERNBERG,* M.D., LL. D., SURGEON-GENERAL UNITED STATES ARMY.

The great obstacle to the advancement of medical science in the past has been respect for authority and the acceptance of the theories and supposed facts without submitting them to the test of experimental verification.

The humoral pathology which Galen (born A.D. 130) developed from the previous teachings of Hippocrates controlled medical thought and influenced medical practice for 1500 years. But we have been emancipated from the

trammels of theory and superstition, and the medicine of to-day is largely based upon exact observation and experimental demonstration. In other words, we may now properly speak of medical science, for, while our knowledge in many directions is far from being complete, it is founded upon a scientific basis of observation and experiment and is being rapidly extended by scientific methods.

The unthinking and unscientific are very ready to believe that not knowing is due to ignorance on the part of the

*Extracts from an address delivered at the Georgetown Medical College, September 1, 1895.—From the Med. Rec.

individual, when in reality it is the brief statement by a well-informed man that the matter referred to has not been determined, and that no one can give the desired information. Under the same circumstances an ignoramus or a charlatan, instead of confessing ignorance, would perhaps gain great credit by a positive assertion with reference to a matter of which he could not possibly know anything. But science teaches that a confession of ignorance is the first step toward the attainment of knowledge. When the anxious mother says: "Doctor, is it diphtheria?" and receives the answer, "I don't know; there is a somewhat suspicious deposit upon the tonsils, and I will at once make a microscopical examination and a culture which will enable me to determine the matter within twenty-four hours," she will probably not be as well satisfied with her medical attendant when she receives the assurance after such an examination, that "it is not diphtheria," as she would have been with the non-scientific doctor, who claims to recognize diphtheria at a glance, announces his diagnosis at once, and "cures" the patient within a day or two. The latter has earned the mother's lasting gratitude, and she will not fail to recommend him to her friends as competent to cure any ailment to which humanity is liable. But our scientific doctor will make his way in the end. He will enjoy the confidence of his fellow-practitioners, and his patients will learn after a time that when he says he knows a certain thing he really knows it, and when he says he don't know, he will do his best to find out, if the question can be solved by reference to medical works in his library, or by an experimental investigation which it is practicable for him to make personally, or which can be made for him in a laboratory devoted to scientific research. He does not make a snap judgment, but waits until all the evidence is in. It is evident that the opinion of a man of this type is of value. His diagnosis, his prognosis, and his advice as to treatment are based upon a careful investigation of the case in hand, a full knowledge of the literature relating to similar cases, and a precise appreciation of the indications to be met by the treatment prescribed.

The conservatism which makes the scientific physician willing to confess ignorance is a very different conservatism from that of the pretentious charlatan and quack, who gives an emphatic denial to facts that are well established upon evidence with which he is not familiar, or which his intellect is not capable of appreciating. I have protested against calling the graduates of our leading medical colleges "old-school" doctors, but it must be admitted that there are still some very old-school doctors among the former graduates of regular medical colleges. In the ranks of the medical profession, as elsewhere, there are men who have been left behind in the rapid development of our knowledge, and who protest against the acceptance of facts which have been established by the most unimpeachable experimental evidence. By such protest they simply reveal their own ignorance. But as their opinions are often stated in good and forcible English, other persons, equally ignorant of the evidence, frequently accept them, or quote the old saying—"When doctors disagree, who shall decide?"

As examples of the conservatism of ignorance I submit the following quotations from two recently published papers, having the names of regular graduates in medicine attached to them. In a report to a State Medical Society, signed by a reputable physician, among other conclusions formulated I find the following:

(2.) "That the etiology of infectious diseases is as yet *sub judice*, and that therapeutic methods based upon the assumption that infectious diseases are caused by specific micro-organisms are unscientific."

Another medical writer concludes a popular magazine article as follows:

"We are brought, therefore, to the conclusion inevitably: The germ theory is an assumption of causes, of the existence of which we have no evidence, to account for effects which they by no means explain."

The training which the medical student of the present day receives in the laboratory is essential for other reasons than because of the scientific spirit, which is developed by personal verification of the facts which are recorded in

his text-books of chemistry, histology, bacteriology, etc. Not only does this personal verification impress the facts upon his memory, but he obtains that technical skill in the use of instruments and methods which can only be acquired by practice. In the chemical laboratory he learns to detect poisons, to determine the nature of impurities in water or air, to examine urine, etc. His practical course in histology makes him familiar with the use of the microscope and with the minute anatomy of healthy tissues. In the pathological laboratory he learns to recognize the results of different morbid processes and the presence of parasitic micro-organisms in the blood or tissues, to distinguish between malignant and innocent growths, etc. By cultivating the principal pathogenic bacteria and examining them under the microscope, after treatment with various staining agents, he becomes familiar with the biological and morphological characters and is able to recognize them wherever they may be encountered. In short, he obtains a practical knowledge of many things, which it is essential for him to know in order that he may be a skilful physician. The knowledge to be obtained from books, which enables the student to pass a creditable examination, does not make him a chemist, a pathologist, a skilful diagnostician, a surgeon or a physician any more than the knowledge to be obtained by reading books on agriculture makes a man a farmer, or than the study of books on navigation would enable a man without practical experience to take command of a trans-Atlantic steamer. It is in recognition of this fact that the Medical Faculty of the University of Georgetown has, as already stated, decided to extend the hours of instruction "so that more time may be given to practical work in laboratories and hospitals." Every physician of experience will approve of this decision. It is true that but few of the prominent physicians of the present day enjoyed such advantages as it is proposed to give to their successors. It is also true that a majority of these prominent physicians were very imperfectly prepared for the duties and responsibilities of a general practitioner when they received their medical degree. This fact has

long been recognized within the ranks of the profession, and it is for this reason that hospital appointments have been so eagerly sought by those having a proper professional ambition. In the hospital the young doctor learns to apply his knowledge and to meet emergencies with composure and professional skill. His books have taught him what to look for, what to listen for, and what to feel for, but practice alone can give him the trained eye, the trained ear, and the *tactus eruditus* of the accomplished physician.

It is in the laboratory that the student acquires deftness in delicate manipulations required in his chemical, histological and bacteriological studies; here he learns to measure and weigh with accuracy, to appreciate the slight differences in color-reaction, in form or in structure, upon which he must often depend for the recognition of toxic agents, pathogenic germs, or abnormal growths; his eye becomes trained to recognize the malarial plasmodium, the tubercle bacillus, and other micro-organisms, which are only revealed to us by the highest powers of the microscope, under proper illumination, and in skilfully mounted preparations; and it is here that conditions are most favorable for the development of that spirit of doubt and inquiry which is so essential for the progress of scientific medicine. Where there is no doubt there will be no investigation. The farmer who accepts the traditional belief that certain seed must be planted in the light of the moon in order to obtain the best results, would consider it a waste of time to make a comparative experiment. But it is by means of comparative experiments that we arrive at definite conclusions in the laboratory, and the great diversity of opinions with reference to the curative action of drugs is largely due to a failure to apply the same methods in practice. This failure has been partly due to want of appreciation of the necessity for a control-experiment in judging of the results supposed to follow a certain course of treatment, and partly to the difficulty of making such a control-experiment in clinical medicine. The unscientific mind jumps at conclusions that are entirely unjustified by the facts. The warts upon the child's hand are

rubbed with a piece of meat which is thrown over the left shoulder, etc., and they subsequently disappear; a horse-chestnut or a potato is carried in the pocket for years and the individual does not suffer from rheumatism during the entire time. The child has a high fever at bed-time, the mother gives it a sugar pill and the next morning the fever has entirely disappeared, and so on *ad infinitum*. *Post hoc ergo propter hoc!* But the man of science asks: What would have happened if the warts had not been rubbed with meat, or saliva, or whatever may have been the particular fetich employed? Would the man have had rheumatism if he had left the horse-chestnut on the tree or the potato in the ground? Would the child's fever have disappeared if the mother had failed to give it the sugar pill? To determine this a comparative experiment is evidently required. Take the case of the child for example. To determine whether the disappearance of the fever was in fact due to the administration of the sugar pill we should have another exactly similar case—a child of the same age, under similar conditions and suffering from an elevation of temperature due to the same cause. One child should have the pill and the other should have nothing. Even then the result would not be conclusive. Science demands that the experiment should be repeated several times. There are so many chances that the conditions may not, after all, have been exactly identical. No truly scientific man would venture to announce a fact as established upon the basis of a single successful experiment. And, having in view the fallability of human judgment, the tendency to draw conclusions favorable to the prejudices or desires of the individual, and the frequency with which erroneous conclusions are published upon what appears to be a substantial experimental basis, science demands verification of reported results by two or more independent investigators before finally accepting these results as demonstrated facts. All this is so far away from the ordinary methods of arriving at conclusions, that the conservatism of the scientific physician meets with very little sympathy on the part of the general public. The man with a horse-chestnut in his pocket is

not only convinced by his individual experience that this is a sovereign cure for rheumatism, but he is apt to resent your non-acceptance of his experiment as conclusive. We, on the other hand, know that medical literature abounds in instances of the ultimate failure of therapeutic agents and methods of treatment, which have for a time been lauded as specific, and have been endorsed by prominent physicians. We are therefore becoming more and more exacting in our demands as regards proof, and as a result medical science is making rapid progress. How great this progress has been is not fully appreciated by the non-medical public.

While we justly pride ourselves upon the rapid development of our knowledge during the last half of the present century, we must not forget that in some directions the foundations of scientific medicine were substantially laid by the illustrious physicians of the past. The time at my disposal will not permit me to give an extended review of the development of medical knowledge, but a brief reference to some of the more important events which have marked this progress will perhaps be useful, as showing the extent of the field and the advantages which the physician of to-day has over his predecessors.

Hippocrates and his illustrious successors, Celsus, Galen, and others, were certainly the peers of modern physicians in their powers of observation, and we are indebted to them for a mass of recorded facts relating to disease, which have been verified and added to by subsequent observers. But observation, in the absence of the instruments and methods of modern science, goes but a short distance in the direction of unveiling truth, and often leads to erroneous conclusions. Observation led the ancient philosophers to believe that the sun goes around the earth, and that water and air are elements. The experimental methods of modern science have revealed to us the constant presence of three elementary gases in the atmosphere, one of which is also a constituent of water, while one—argon—has only just been revealed to us by the researches of Professor Ramsey and Lord Rayleigh. One of the first lessons to be learned by the student of medicine is

not to trust implicitly to the evidences of his senses. This is the fundamental error of ignorant persons, and the foundation of demonology and superstitions of all kinds. The eye tells us that water from the well is perfectly pure, but the microscope shows us that it swarms with living organisms. The touch tells us that the patient has a high fever, but the clinical thermometer says no—the sensation received was due to the comparatively low temperature of our own hand at the time of making the observation, etc.

The anatomical knowledge of "the father of medicine" was very imperfect, because it was not obtained by the dissection of the human body. The Greek physicians, Herophilus and Erasistratus, of the Alexandrian school of medicine, who lived about 300 B. C., are believed to have been the first to study anatomy in this way, and from that time our knowledge in this essential department of medicine has steadily increased, until at present it is perhaps more nearly complete than in any other branch. The medical student of to-day is expected not only to acquire an accurate knowledge of anatomy in the dissecting room, but he must study the minute anatomy of the tissues by means of the microscope and the methods of investigation, which he will learn in the histological laboratory. He is also expected to have at least an outline knowledge of comparative anatomy, a branch of scientific research which dates back to the time of Aristotle (384 B. C.) and which has been greatly developed during the present century. Our knowledge of minute anatomy has been largely acquired during the past sixty years, as a result of the improvements in the compound microscope made about 1830. The perfecting of this invaluable instrument of research has also led to vast additions to our knowledge in the department of general biology, of which it is important that the medical student should possess at least an outline. A knowledge of the structure and development of lower organisms is justly regarded as a proper introduction to the study of human anatomy and physiology. Embryology, a branch of science which may also be said to have had its birth in the present century, must not

be neglected by the student of medicine. It is true that Galen made observations upon the development of the incubated egg, and that Harvey, in the seventeenth century, made some important observations in the same line of investigation, but the minute and accurate knowledge of the present day depends upon the comparatively recent improvements in the compound microscope just referred to.

Progress in physiology, as in other branches of medical science, has resulted from the application of the experimental method to the problems to be solved. Galen made an important addition to human knowledge when he demonstrated that urine is secreted by the kidneys, a fact which, apparent as it seems to us to be, had not previously been recognized. It was nearly fifteen hundred years later that Harvey (1628) demonstrated the circulation of the blood, a discovery which is justly considered one of the most notable events in the history of medicine. The subsequent explanation of the process of respiration by Lavoisier (1783), the experiments upon gastric digestion by Beaumont (1834), and the discovery of the function of the vasomotor nervous system by Claude Bernard, opened the way to a fertile field of research which is still being vigorously prosecuted in physiological laboratories; and the results attained constitute an essential part of the medical education. The progress of our knowledge of physiology has necessarily been secondary to the advancement of chemistry. Indeed, physics and chemistry constitute the foundation of medical science. We, therefore, place Priestley's discovery of oxygen (1783) among the epoch-making events in the history of medicine. It is due to chemistry that we are able to use the active principles of various drugs of demonstrated value, instead of the crude material—leaf, root, or bark; and the chemists have recently made many valuable additions to the list of approved therapeutic agents—principally from the series of coal-tar products.

The importance of carefully studying the results of morbid processes in the post-mortem room and in the pathological laboratory is now generally recognized, and the medical student will find

that since Morgagni (1682-1771) led the way in the study of morbid anatomy, an enormous amount of work has been done in this field of investigation. He will be required to make himself familiar not only with the facts developed, but with the methods of research and the microscopical and gross appearances of tissues, which have undergone the changes due to disease. Important as these studies are, the results obtained, from a practical point of view, are eclipsed by the brilliant discoveries which have been made during the past twenty years with reference to the etiology of infectious diseases, which to a considerable extent have been prosecuted in laboratories devoted to pathological research. These discoveries, like others heretofore referred to, depend primarily upon the improvements which have been made in the compound microscope, especially in high power objectives and means of illumination; and upon methods of research devised by the pioneers in this field of investigation, among whom the names of the French chemist Pasteur, and the German physician Koch are pre-eminent.

The development of our knowledge relating to the bacteria dates from the controversy relating to spontaneous generation, which was finally settled by the experimental demonstration made by Pasteur (1860), that no development of micro-organisms occurs in organic infusions which have been sterilized by boiling; and that fermentation and putrefaction depend upon the introduction of living germs into such infusions. The distinguished French physician Davaine first demonstrated the etiological relation of a micro-organism of this class to a specific infectious disease. The anthrax bacillus had been seen in the blood of animals dying from this disease by Pollender in 1849, and by Davaine himself in 1851, but it was not until 1863 that the last-named observer felt justified in asserting, as a result of inoculation-experiments, that the bacillus was the essential etiological factor in the production of anthrax.

In 1873 the German physician Obermeyer discovered the spirillum of relapsing fever in the blood of patients suffering from that disease. The typhoid bacillus was discovered by Eberth, and

independently by Koch in 1880. The same year the present speaker discovered the pathogenic micrococcus, which is now recognized as the cause of croupous pneumonia. In 1882 Koch published his discovery of the tubercle bacillus. The glanders bacillus was discovered by Loeffler and Shutz in 1882; the bacillus of diphtheria by Loeffler in 1884; the bacillus of tetanus by Nicolaier in the same year. It was also in this eventful year that Koch published the discovery of the cholera spirillum. Since these important discoveries our knowledge of the pathogenic bacteria has rapidly increased, and it is now demonstrated that erysipelas, septicæmia, puerperal fever, wound infections, boils and abscesses, peritonitis, pleurisy, etc., are due to general or local infection with germs of this class.

Evidently the medical student of the present day must be made familiar with these recent additions to our knowledge of disease, and his acquaintance with these microscopic foes of the human race should be of that practical character which can only be obtained in the laboratory.

I have already occupied so much time that I can refer but briefly to the advancement in clinical medicine, which depends largely upon additions to our knowledge already referred to. The use of the stethoscope, the clinical thermometer, the laryngoscope, the ophthalmoscope, and other aids to diagnosis has introduced certainty in place of uncertainty, science in place of guesswork. Our knowledge of the pathogenic bacteria tells us not only where to find them, but how to destroy them when they are accessible to the action of physical or chemical agents. This knowledge has undoubtedly resulted in the saving of thousands of valuable lives. This has been accomplished by means of antiseptic or aseptic methods in surgical and obstetrical practice, and by the intelligent use of disinfectants for the destruction of infectious material, wherever it may be found. As a result of such procedures we have during recent years escaped any devastating epidemic of cholera or yellow fever, although the first-mentioned disease has twice been introduced into the harbor of our principal seaport, and yellow fever

prevails annually in the cities of Havana and Vera Cruz, with which we have close commercial relations.

The medical student is expected to prepare himself for continuing the work of his predecessors in preventive medicine, although this work has a constant tendency to diminish the demand for his services. To the credit of our profession be it said that this selfish point of view has never controlled its action, and it is largely to the efforts of physicians that existing laws and regulations have been enacted for the prevention of the extension of infectious diseases, the maintenance of a pure water supply for towns and cities, and general sanitary supervision exercised by local and State boards of health.

The most notable recent additions to our therapeutic resources are the antitoxins of diphtheria and of tetanus, and the use of thyroid extract for the cure of myxœdema. But I cannot dwell upon the possibilities in the way of specific medication, which are suggested by these recent achievements of scientific medicine. Certainly I have said enough to indicate to the young man who contemplates entering upon the study of medicine, that his best energies will be needed to master all the important details in the various branches to which reference has been made; and to justify the Medical Faculty of the University of Georgetown in extending the hours for instruction and in requiring that students shall take the practical laboratory courses, which have been arranged for, as announced in the recent "Circular of Information" already referred to.

Having attempted to give you some idea of the present status of scientific medicine, I desire briefly to call your attention to certain matters which are extremely discouraging for the truly scientific physician, although he seldom refers to them, and, perhaps wisely, trusts to time and the diffusion of knowledge to remedy the evils to which I shall refer.

Hand in hand with the progress of medical science we see an army of pseudo-scientific quacks who trade upon the imperfect knowledge of the masses, and by plausibly written advertisements convince many, even of the educated

classes, that their particular method of treatment is based upon the latest scientific discoveries. A Priestley discovers oxygen; the physiologists show that this gas is essential to life, and that the maintenance of a full degree of vital activity depends upon the possession of healthy lungs of ample capacity and the respiration of pure air; the scientific physician discovers defects in the respiratory apparatus, and under certain circumstances prescribes oxygen for the relief of symptoms resulting from a deficient supply of this life-sustaining gas. But the pseudo-scientist extols oxygen as a cure-all for pulmonary complaints, or invents an apparatus, which may be held in the hand or carried in the pocket, by which oxygen will be absorbed in some mysterious way, and without difficulty obtains numerous certificates as to the marvellous cures affected by his method. A Franklin draws lightning from the clouds; a Galvani shows that an electrical current may be developed by the contact of metals and that such a current causes muscular contraction; and innumerable patient investigators add to our knowledge of electricity. The scientific physician avails himself of this potent agent for the treatment of certain ailments, in which it appears to be indicated but admits that he meets with many disappointments in his clinical experiments. The pseudo-scientific quack writes, or has written, advertisements in which fact and fiction are so commingled that even educated persons may be deceived, and having aroused interest in the alleged therapeutic value of this mysterious agent offers his electric belt, or finger-ring made of two metals, or pocket battery, as a sure cure for certain specified ailments; or, if less modest and more certain of the credulity of the public, as a cure for all of the diseases to which man is subject. Again, a Pasteur proves that the disease of sheep and cattle known as anthrax is due to a microscopic organism found in the blood; an Obermeyer discovers a different micro-organism in the blood of relapsing fever patients, and numerous patient workers in laboratories rapidly add to our knowledge of pathogenic bacteria. Then comes the man with the microbe-killer. He tells you that all

diseases are due to germs in the blood and that his fluid kills them without fail. Science has demonstrated that comparatively few of the infectious diseases of man are due to the presence of pathogenic bacteria in the blood, and that the microbe-killer has but little germicidal value; but a credulous public accepts the interesting statements which appear to have a scientific basis, and swallows the microbe-killer with impunity, if not with benefit. And so it goes, science establishes the value of thyroid extract for the cure of myxœdema, and immediately the public are called upon to swallow extracts of brain for cerebral troubles; of heart, for cardiac diseases, etc. Even the Chinese pulse-doctors obtain a large *clientele* on the Pacific coast. Their solemn looks and pretentious claims impose upon the ignorant, and it is said that educated people not infrequently consult them. It is true that in China, as elsewhere, there are two classes of physicians. Those who are educated and who are familiar with the medical classics of their country, and the itinerant quacks, who are not only ignorant but unprincipled. No doubt, the regular practitioner in China believes in his own pseudo-science. According to a recent author,* "the learned Chinese doctor is not ignorant in the sense that he has not studied, as from early youth he has been subjected to a degree of cramming and of learning by rote, such as would discourage and wear out the less patient and less toiling Caucasian. He has been obliged to learn stacks of sacred precepts taken from their most ancient sages; and the admixture of intricate and bewildering astronomy, meteorological signs, and endless physical complications of concurrent signs, appearances, and detached disturbances, that he has been compelled to learn by heart, is simply appalling. Anatomy and physiology cut no figure in these studies and they are considered wholly unnecessary, as disease is a matter depending on good or bad vapors, and is either of divine or diabolical origin. In spite of their most elaborate treatises upon the pulse, from which they profess to be able to perform the most skillful diagnosis, they are

even unacquainted with the existence of the circulation."

The time at my disposal will only admit of a brief reference to the Chinese theories relating to disease and its treatment. As was the custom among the more enlightened Occidental nations, until a comparatively recent period, their prescriptions often contain twenty or more ingredients, apparently given with a vague idea that one out of the number may prove to be the right remedy. These ingredients are obtained from all imaginable sources and include all kinds of nastiness, in the way of excretions, desiccated animal tissues, etc. With them the color of a medicine is an essential character; red medicines being suitable for diseases of the heart; white, for pulmonary complaints; black, for diseases of the kidneys; green, for those of the liver; and yellow, for those of the stomach. In the use of remedies from the vegetable kingdom the leaves and branches are most appropriate for diseases of the extremities, the bark should be used for skin diseases, the pith for derangements of internal parts of the body, etc.

In conclusion, I desire to emphasize the fact that learning does not enable a man to distinguish between science and pseudo-science. The learned disciples of Confucius in the Orient, and classical scholars of the pre-scientific epoch in Occidental countries, formerly failed to distinguish between the fact of astronomy and the fancies of astrology. And, at the present day, eminence as a classical scholar, or as a theologian, or as a jurist, or as a metaphysician, in the absence of a knowledge of the methods and results of modern scientific investigation, does not enable a man to distinguish between science and pseudo-science in medical practice. This kind of learning is therefore not essential for the physician; but, as we insisted at the outset, he should not enter upon the study of medicine without having at least a thorough knowledge of his own language and of those branches of study pursued in the high schools of our large cities; we now add that a reading knowledge of the French and German will be very desirable, if he wishes to keep entirely *au courant* with the progress of medical science.

* Dr. P. C. Remondino, of San Diego, Cal.

PERISCOPE.

IN CHARGE OF WM. E. PARKE, A.M., M.D.

MEDICINE.

The Treatment of Cardiac Disease in Children.

The following rules are given by Perrier as to the management of this condition. In the first place, the child should be protected from cold, both because it depresses vitality and also because cold may cause internal congestions. Much fatigue is to be avoided and violent exercise forbidden. In the case of girls, particular attention is to be paid to these points at the approach of puberty. Secondly, the greatest care should be exercised as to diet, which should be simple, and consist largely of milk, eggs, easily digested soups, and tender, plainly cooked meats. Milk should be the drink for each meal. Thirdly, a life in the open air is very essential, and the climate should be changed by resorting to warm places in winter and cool ones in summer, for all persons with cardiac disease, particularly children, suffer from rapid changes of temperature. Cold sponging followed by dry rubbing is also of value. In the way of tonic treatment, one of the following prescriptions may be used alternately every five days:

Fowler's solution, 4 drachms.

Sig.—1 drop *t. i. d.*

And

Tincture of gentian, 1 ounce.

Sig.—1 teaspoonful *t. i. d.*

Often, too, a small glassful of malt extract is of service after meals.

Should there be much cardiac excitability, the following may be used in the dose of a teaspoonful twice a day:

Bromide of calcium, 2½ drachms.

Syrup of bitter orange, 4 ounces.

Should there be a tendency to constipation, a little magnesia may be given once or twice a week.

When there is well-marked rupture of compensation and the muscle is feeble, an absolute milk diet with rest in bed is advisable, the food being given at frequent intervals in small doses and diluted, if the urine is scanty, with lactose in water or by some alkaline water, such as Sels. Every two hours between the doses of food the following may be used with advantage:

B Tincture of digitalis, 5 to 10 drops;

Tincture of cinchona, 7 drachms;

Syrup of orange, 3 ounces.

A teaspoonful about half an hour after eating.

Every morning, to avoid straining, an enema may be given to move the bowels and to favor diuresis. Once in every two weeks a small blister may be placed over the heart with advantage.

Where the rupture of compensation has lasted for some time, the following may be ordered:

Caffeine, 4 to 7 grains;

Benzoate of sodium, 15 to 30 grains;

Syrup, 5 drachms;

Peppermint-water, 3 ounces.

Dessertspoonful *t. i. d.* for a child of from seven to twelve years.

Should there be cyanosis, it may be wise to use

Extract of convallaria majalis, 8 grains;

Syrup, 1 ounce;

Infusion of cinchona, 3 ounces.

A warm rectal injection should be ordered night and morning, and every eight or ten days a small blister applied to the præcordium. If there is a tendency to dropsy, hot-air baths may be used with caution, and if sudden cardiac oppression comes on, hypodermic injections of ether are to be employed.—*Maladies des Enfants, Therapeutique Gaz.*

THERAPEUTICS.

Europhen in the Treatment of Infected Wounds.

Europhen embodies certain properties which render it eminently adapted for the treatment of wounds of the extremities in which infection has taken place. According to the researches of Vulpinus it is a powerful and reliable germicide exerting its action without any risk of toxic effects from absorption or local irritation, as is the case of the antiseptics commonly employed. Its lightness and bulkiness gives it a large covering power, while, owing to its adhesive quality, it forms a protective covering over wounds under which granulation rapidly progresses.

Another advantage—not to be underestimated—is its agreeable odor. A writer in the *Aesculapian*, April, 1895, expresses the opinion that, while europhen is almost a specific in the treatment of chancroid or syphilitic lesions, it is also an excellent dressing for infected wounds. He cites, among others, a case of badly infected wound of the hand, which after incision and irrigation with bichloride solution was packed with europhen gauze. On return of the patient three days after the dressings the inflammation was found to have subsided and the hand was in a fairly good condition. The treatment was continued and in ten days the patient was pronounced cured. The writer states that one of the best features of this treatment is the fact that the old offensive odor of iodoform was entirely done away with and in place of it was a very slight but very pleasant odor, resembling saffron, and save to near observers it was not noticeable at all. There was no dermatitis set up by the europhen, its whole action on the skin being very mild.

Completely confirmatory of this favorable testimony is the statement of the editor of the *Codex Medicus Philadelphicus*, June, 1895, that the most striking results obtained from its use in his own experience, have been observed in the treatment of infected wounds of the hands. He further remarks that under the protective influence of europhen the foulest wounds become healthy and heal with surprising rapidity.